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AD853839
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AD853839

NWC TP 4633

AIRBORNE STORES CAPTIVE FLIGHT LOADS COMPUTER PROGRAM

by

Lovic P. Thomas
Aeromechanics Division
Weapons Development Department

ABSTRACT. Design loads computations for airborne stores is such a recurrent need that it became worthwhile to program the tedious task for digital computers. Two hanger configurations are treated: (1) the two-lug, four-sway-brace bomb rack common to U. S. stores, and (2) a statically determinate configuration often used for rail-launched missiles. Procedures recommended by MIL-A-8591 are used where applicable. Component hanger loads for stores subjected to arbitrary load conditions in captive flight are printed, and shear-moment distributions are plotted.

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M. R. Etheridge, Capt., USN .... Commander
Thomas S. Amlie, Ph.D. .... Technical Director

FOREWORD

This report documents one of several efforts supported by the work unit entitled "Structural Interface Problems of Air Weapons." Funding was provided by the Naval Air Systems Command under AirTask A32-320-067/216-1/F009-07-01.

The work reported herein was done during 1967-68 to provide an automated method for computing large quantities of captive-flight design-load data on airborne stores. The computer program described may be used as a working tool to estimate preliminary design loads. Methods to refine captive flight loads estimates through better accounting for interference aerodynamics, and including static and dynamic structural elastic effects, are being developed. Whereas the methods used in the present computer programs are not suitable for design optimization, they will provide "first cut" design loads using procedures recommended in MIL-A-8591.

This report has been reviewed for technical accuracy by James E. Serpanos and William J. Werback. It is released at the working level for informational purposes only.

Released by
R. W. VAN AKEN, Head,
Aeromechanics Division
14 October 1968

Under authority of
F. H. KNEMEYER, Head,
Weapons Development Dept.

NWC Technical Publication 4633

Published by .... Weapons Development Department
Manuscript 40/MS 68-97
Collation .... Cover, 154 leaves, DD Form 1473, abstract cards
First printing .... 165 unnumbered copies
Security classification .... UNCLASSIFIED

ACCESSION for
CFSTI WHITE SECTION
DDC BUFF SECTION
UNANNOUNCED
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CONTENTS

INTRODUCTION

Design loads under many load conditions specified by MIL-A-8591C (Ref. 1) are often needed in the early design phase of airborne stores.[1] This need recurs so often and load conditions are so numerous, that a computer program was written to automatically generate hanger loads and shear-moment diagrams. The program, as described herein, can handle two hanger configurations: the two-lug and sway brace suspension described in Ref. 1, and the statically-determinate rail launcher as described in Ref. 2. Aerodynamic forces on wings and fins, and distributed aerodynamic loads on bodies can be included, although presently in a crude fashion. In addition to hanger loads, simple shear and bending moment diagrams are automatically plotted. Elasticity effects are not included in the present program.

SUMMARY DESCRIPTION

The airborne stores captive flight loads computer program consists of 13 program segments named as follows for reference purposes:

1. WEIGHT
2. MAIN
3. HANGER/A
4. HANGER/B
5. ALLPTS
6. CONCLD
7. AIRLOD
8. AMCOEF
9. SMDIAG
10. PINTEG
11. RSLTNT
12. ENVLOP
13. SCALE

[1] "Airborne stores" collectively encompasses aircraft-borne missiles, bombs, external drop tanks, etc., when under captive flight carriage.

More detailed descriptions of these program segments will come in later sections of this report, but this section will briefly introduce their manners of working together. A summary flow chart shown in Fig. 1 may help provide a first look at the organization of the program and illustrate the following summary description.

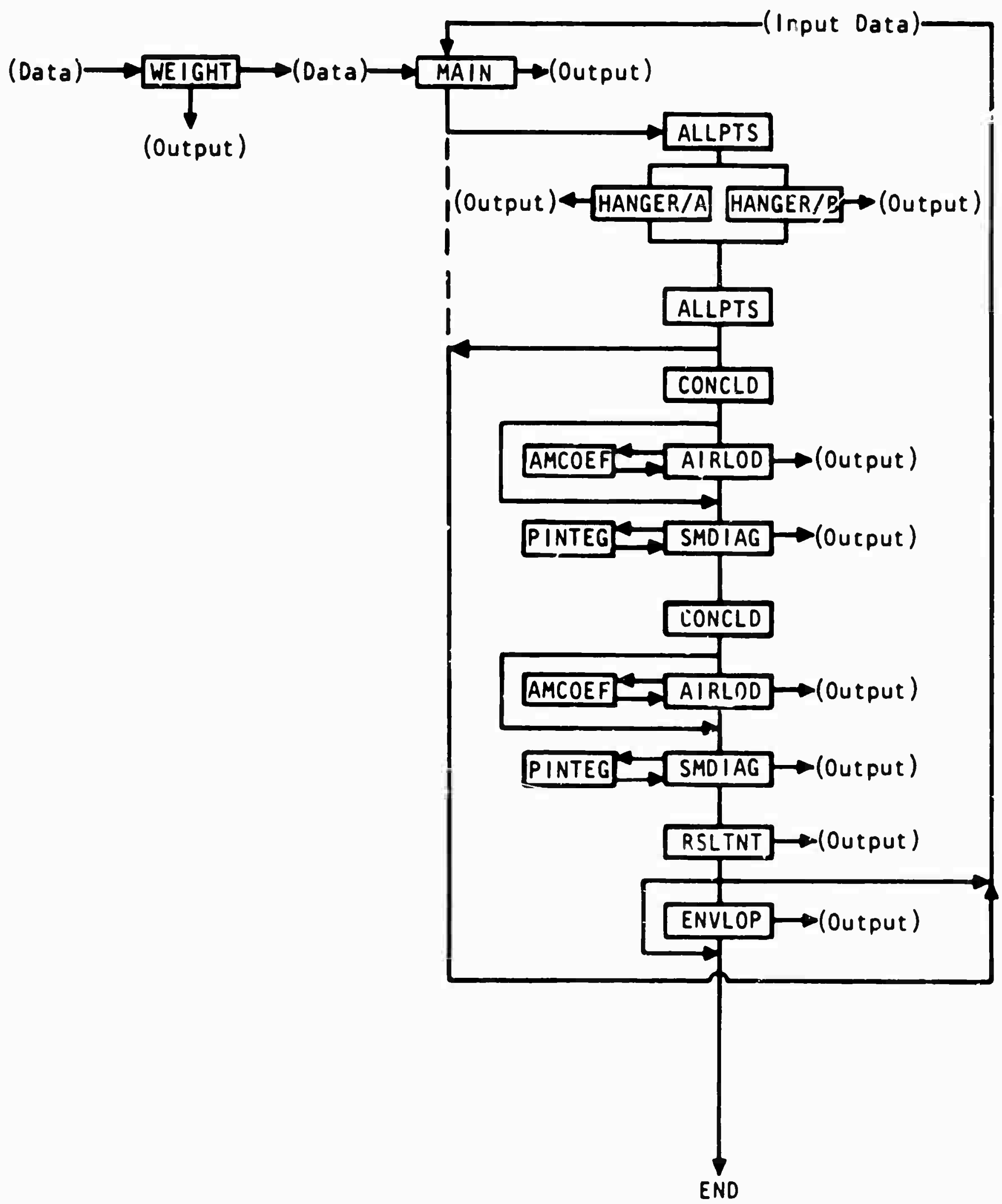


FIG. 1. Summary Flow Chart.

First to be used is WEIGHT, an autonomous program in itself, which adjusts input weight distributions to match input gross weight, center of gravity, and inertia. Besides listing and plotting results, WEIGHT punches cards with weight and inertia distribution data to be used as input to MAIN. MAIN accepts these and other input data describing the store, load conditions, and output plot specifications, sometimes operates on these data before presenting them to other subroutines it calls, and serves as a master program for the several worker subroutines. Designed into MAIN is some flexibility by way of options to choose between two available hanger loads subroutines, to omit computation of distributed loads, to ignore aerodynamic loads, to process batch runs of load conditions, and to provide maximum load envelopes resulting from a batch run. HANGER, in one or the other of its two available forms, computes hanger loads for either statically-determinate missile launcher racks or two-lug and sway-brace configurations typical of free-fall weapons. The flagged subroutine feature of Univac 1108 is used to choose between versions of HANGER at execute time.

ALLPTS is a linear interpolation subroutine whose main purpose is to shorten input data requirements for distributions of body diameter and pressure. CONCLD generates concentrated loads on the store's body assumed to account for aerodynamic loads contributed by fins and wings, and positions these and other concentrated hanger loads generated by HANGER. Aerodynamics-related results of CONCLD are further manipulated by AIRLOD, and are ultimately used by SMDIAG. AIRLOD adjusts distributed and concentrated aerodynamic loads to ensure compatibility with gross aerodynamic forces and moments. AIRLOD and WEIGHT are similar in their purposes, both ensuring compatibility between distributed and gross features of the store so that shear and moment diagrams will finally close. AMCOEF is used by AIRLOD to compute pitch and yaw moment coefficients from distributed and concentrated aerodynamic forces and moments. Within AIRLOD, the results of AMCOEF are compared with gross moment coefficients to provide a basis for deciding whether to readjust distributed aerodynamic loads. SMDIAG accumulates all loads, integrates them twice (using PINTEG) along the store's length, and plots shear and bending moment diagrams. PINTEG is a trapezoidal integration routine used by SMDIAG in integrating loads.

The summary flow chart attempts to show that CONCLD, AIRLOD, SMDIAG, and their helper subroutines are used twice for each set of load condition data--once for each of two perpendicular planes intersecting at the store's longitudinal body axis. Next, RSLTNT plots the resultant of shears and bending moments derived from components produced by SMDIAG in the two perpendicular planes. RSLTNT also tests each of the current resultant shears and moments against the previous maximum values at each body station, and stores the largest of these values for later

use. At this point, either another set of load condition data is read and computations repeated, or ENVLOP is called upon to plot and print the maximum envelope of resultant shears and bending moments computed during the current batch of load condition sets. ENVLOP may be skipped if the user desires. Passage through or around ENVLOP terminates the computer run.

One other subroutine, SCALE, completes the list included in this report. SCALE is an automatic plot ordinate scale specification routine especially designed for this program. More detailed discussions of each of the individual subroutines--including equations programmed, listings, and individual flow charts--are presented in the following sections.

PROGRAM WEIGHT

WEIGHT is an autonomous program in itself, whose purpose is to adjust input weight distributions to match input gross weight, center of gravity, and inertia. Adjusted weight and inertia distributions are listed and plotted, as well as punched into cards for later use. This chain-job technique of punching cards by computer to be read back into the computer later was adopted for two reasons:

1. A large number of loads computations are often done using one set of weight-inertia data.

2. Opportunity is afforded the engineer to critique the adjusted weight-inertia distributions before further use.

The need to make adjustments on weight distributions arises from the fact that hanger loads are computed using gross weight and inertia, whereas distributed weights and inertias are integrated into the shear moment diagrams. Differences between distributed and gross weights and inertias would result in an imbalance of forces and moments.

SYMBOLS AND UNITS FOR WEIGHT

Algebraic symbol	FORTRAN equivalent	Definition
A	A(I)	Station at forward end of store (usually in inches)
B	B(ISEGS)	Station at tail end of store (usually in inches)
I_o	CORRI	Correct gross transverse moment of inertia (usually in lb-in^2)
$I_{sect}(x)$	XISECT	Transverse inertia attributed to individual elemental sections (usually in lb-in^2)
I_T	SUMI	Total of integrated second moment of weight distribution (usually in lb-in^2)
ΔM	DELM	Error in first moment of weight about center of gravity (usually in lb-in)
$w(x)$	W	Running weight distribution, weight per unit length as a function of x (usually lb/in)
W_o	WCORR	Correct gross weight (usually in lb)
W_T	WT	Integrated weight distribution (usually in lb)
Δw_f	DELWFL	Adjustment to distributed weight forward of center of gravity (usually lb/in)
Δw_r	DELWRL	Adjustment to distributed weight aft of center of gravity (usually lb/in)
x	X	Station along store longitudinal axis (usually in inches)
x_{cg}	XCG	Center of gravity station (usually in inches)
Δx, h	H	Incremental station, section thickness (usually in inches)
	A(IS)	The forward end station of a segment
	ALERR	Limit of allowable difference between input gross weight and integrated weight distribution

Algebraic symbol	FORTRAN equivalent	Definition
	B(IS)	The aft end station of a segment--note that for intermediate segment other than the nose or tail, B(IS) = A(IS + 1)
	IS	An index denoting a segment
	ISEGS	Number of segments store is broken up into (a convenient choice determined by location of some discontinuity of property or geometry)
	ITEST	A control index--if ITEST > 0, corrections are made to 2(w) so as to match W_O and I_O. If ITEST $\leq$ 0, no corrections are made, and the input w(x) is integrated to give gross weight and inertia, which are accepted as correct.
	N(IS)	Number of sections a segment is broken into

EQUATIONS

Compatibility between distributed and gross weights and inertias requires that

$$\int^{\text{length}} w(x)\, dx = W_T$$

$$\int^{\text{length}} w(x) \left[x_{cg} - x\right] dx = 0$$

$$\int^{\text{length}} w(x) \left[x_{cg} - x\right]^2 dx = I$$

These requirements are enforced by computer in the following manner.

$$W_T = \sum_x w(x) \cdot h$$

$$\Delta M = -\sum_x w(x) \cdot \left(x - x_{cg}\right) \cdot h$$

If W_T does not compare with W_o within a specified error limit (ALERR), the distributed weight is adjusted by

$$w(x)_{adjusted} = w(x)_{old} + w(x)_{old} \cdot \frac{\left(W_o - W_T\right)}{W_o}$$

Similarly, if $\Delta M/W_T$ (the error in moment arm of distributed weight) exceeds a specified error limit (ERRCG), the distributed weight is again adjusted so as to effect a center of gravity shift to the correct position, but without changing the integrated total of distributed weight. ΔM, the discrepancy in first moment of weight about the correct center of gravity, is used in deriving weight distribution corrections as follows:

$$\Delta M = \Delta w_f \left(A - x_{cg}\right) \frac{\left(A - x_{cg}\right)}{2} + \Delta w_r \frac{\left(x_{cg} - B\right)^2}{2}$$

$$\Delta w_f \left(x_{cg} - A\right) - \Delta w_r \left(B - x_y\right) = 0$$

$$\therefore \Delta w_f = \frac{(\Delta M)(2)}{\left(x_{cg} - A\right) \left[\left(x_{cg} - A\right) + \left(B - x_{cg}\right)\right]}$$

$$\Delta w_r = \frac{(\Delta M)(2)}{\left(B - x_{cg}\right) (B - A)}$$

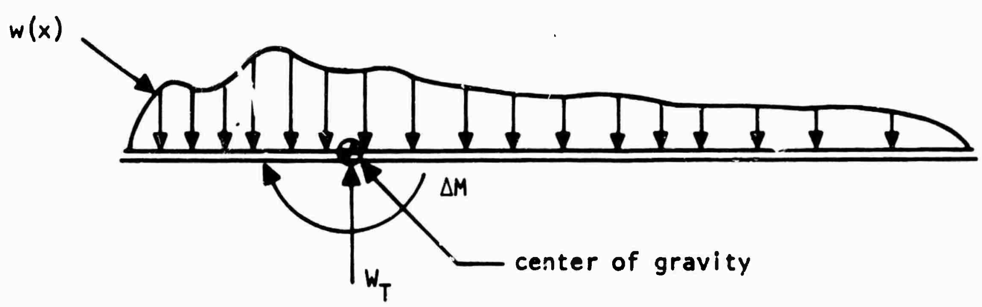
For all x stations ahead of the correct center of gravity

$$w(x)_{adjusted} = w(x)_{old} + \Delta w_f$$

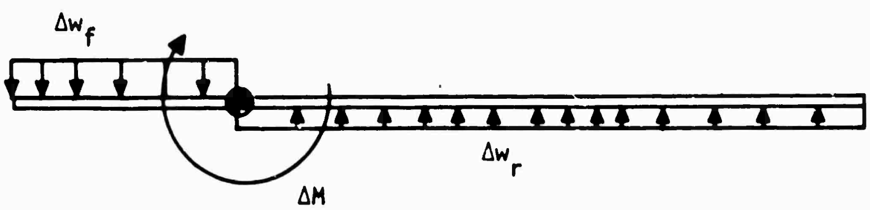
and for all stations aft of the correct center of gravity

$$w(x)_{adjusted} = w(x)_{old} - \Delta w_r$$

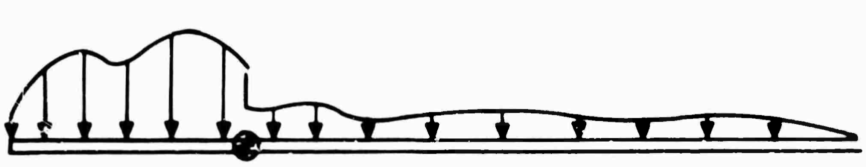
Figure 2 illustrates the function of this adjustment.



(a) Uncorrected Weight Distribution.



(b) Correction to Weight Distribution.



(c) Corrected Weight Distribution.

FIG. 2.

If it is first assumed that sectional slices or elements taken along the store's x-axis may be represented as point masses,

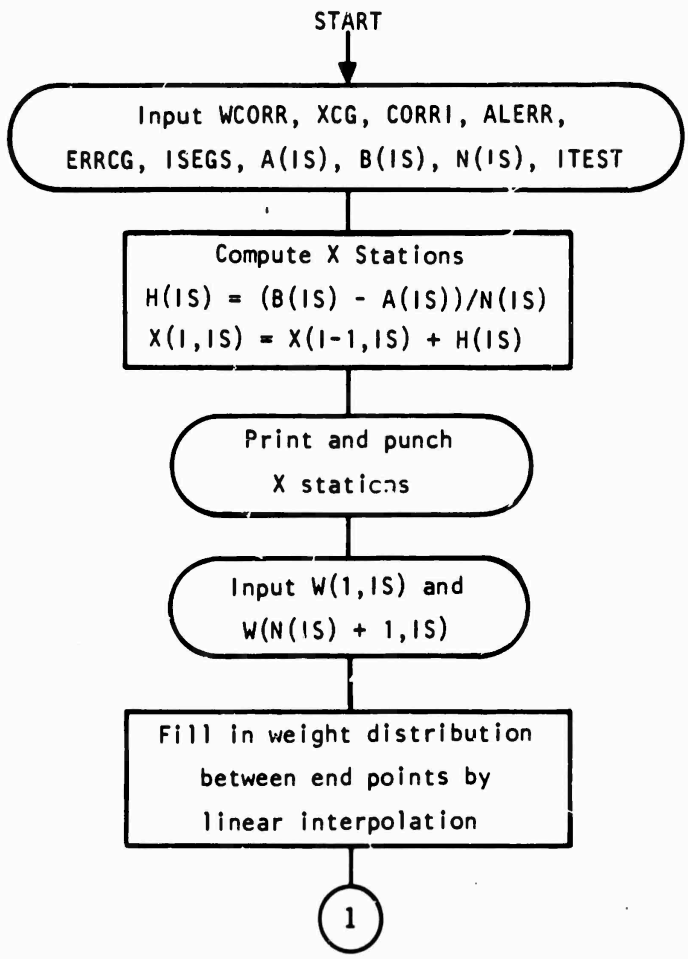
$$I_T = \sum_x w(x) \left| x - x_{cg} \right|^2 \cdot h$$

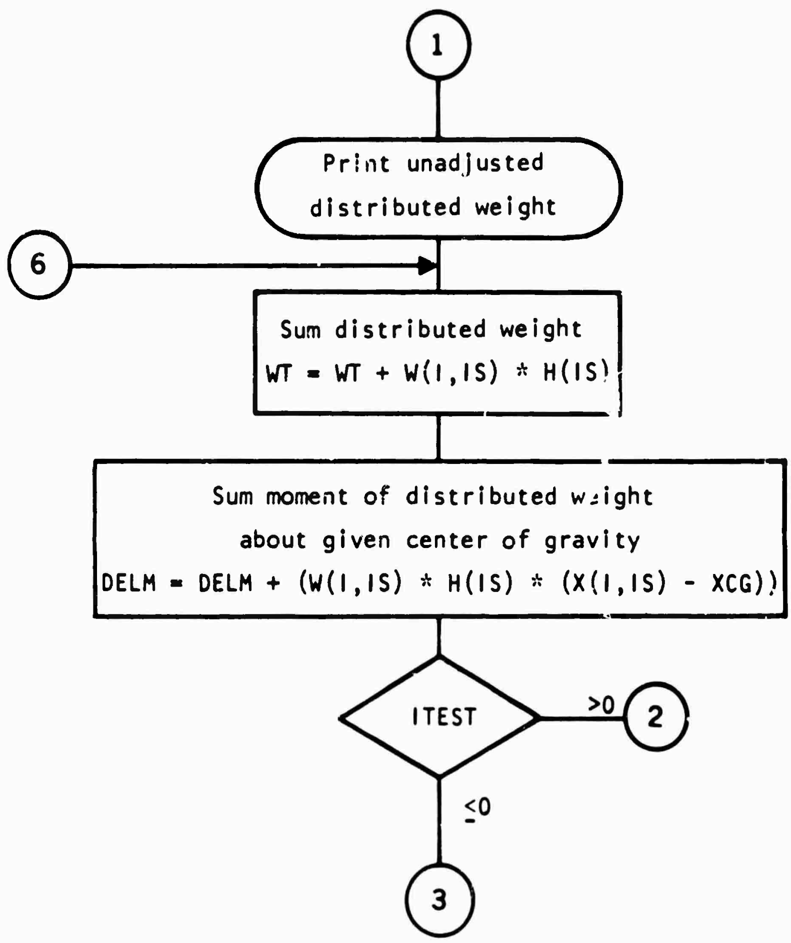
Such will not be the case for more reasons than just physical, so the difference between the correct inertia I_O and the integrated second moment of weight I_T is prorated among the elemental sections proportional to their weights.

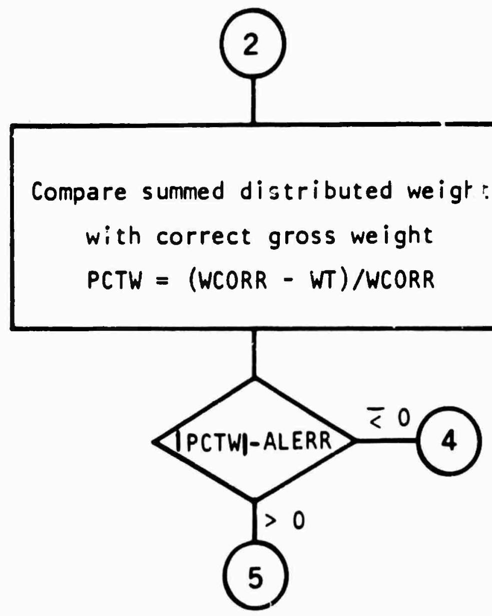
$$I_{sect}(x) = \left(I_o - I_T \right) \cdot h \cdot \frac{w(x)}{W_o}$$

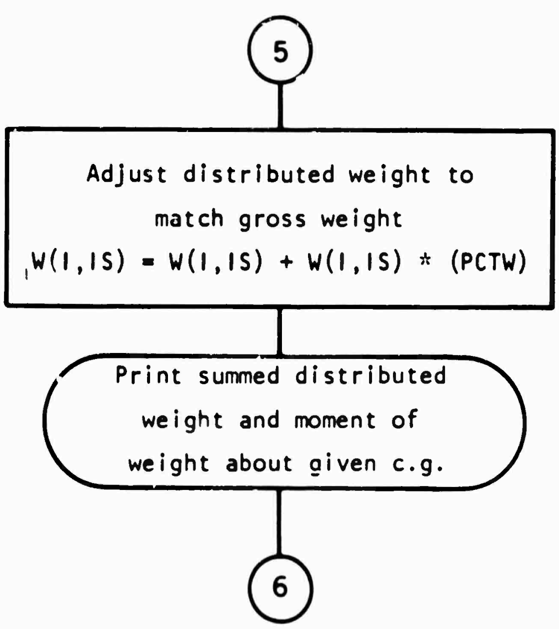
A warning should be given here against allowing too large a difference between I_O and I_T, for such a situation may cause nonclosure of moment diagrams produced by later programs which use the results of WEIGHT.

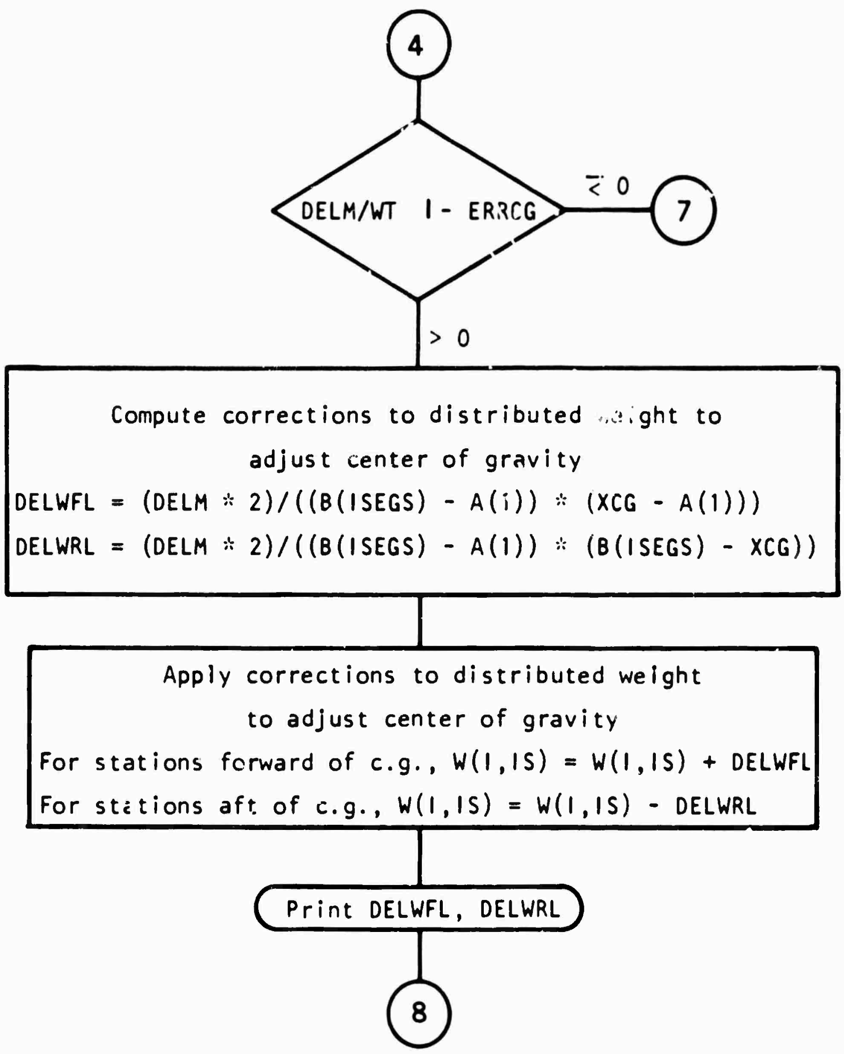
FLOW CHART

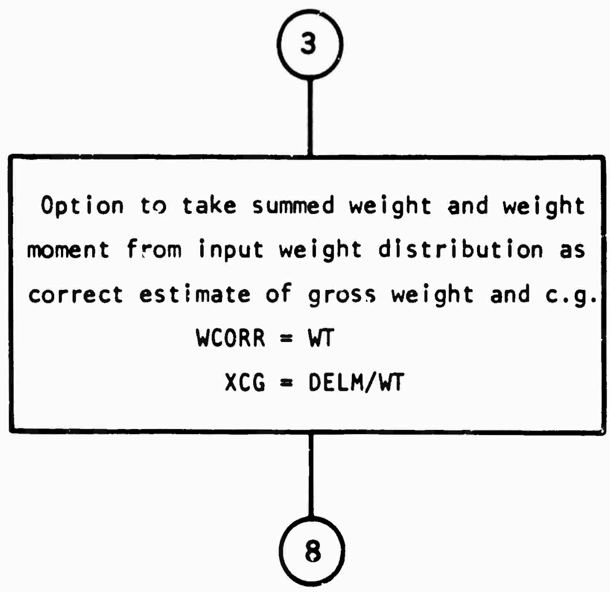

START
Input WCORR, XCG, CORRI, ALERR,
ERRCG, ISEGS, A(IS), B(IS), N(IS), ITEST
Compute X Stations
H(IS) = (B(IS) - A(IS))/N(IS)
X(I,IS) = X(I-1,IS) + H(IS)
Print and punch
X stations
Input W(1,IS) and
W(N(IS) + 1,IS)
Fill in weight distribution
between end points by
linear interpolation
1

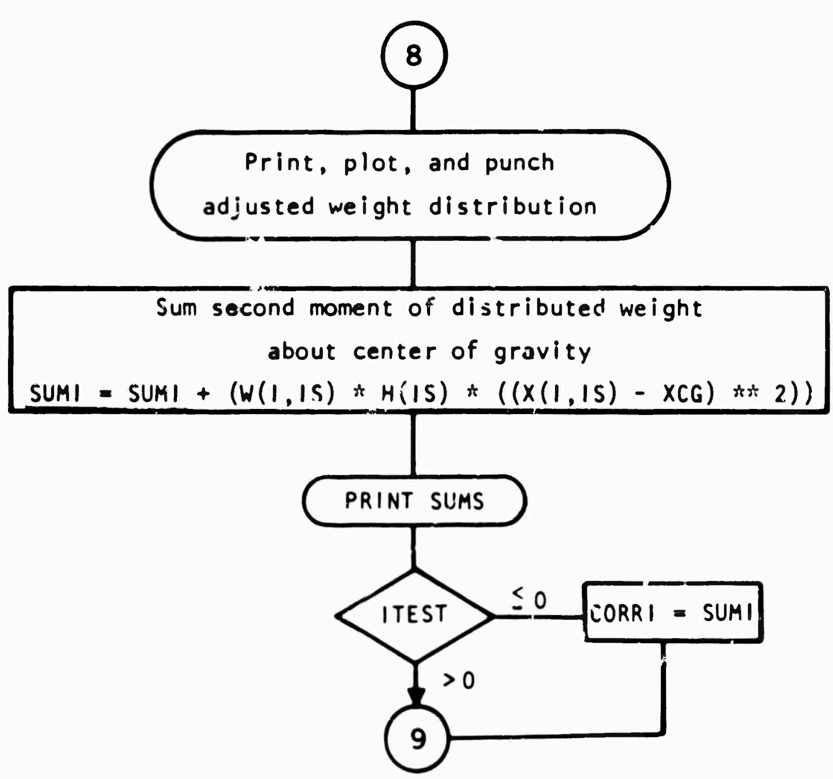

1
Print unadjusted distributed weight
6
Sum distributed weight
WT = WT + W(I,IS) * H(IS)
Sum moment of distributed weight about given center of gravity
DELM = DELM + (W(I,IS) * H(IS) * (X(I,IS) - XCG))
ITEST
>0
2
≤0
3

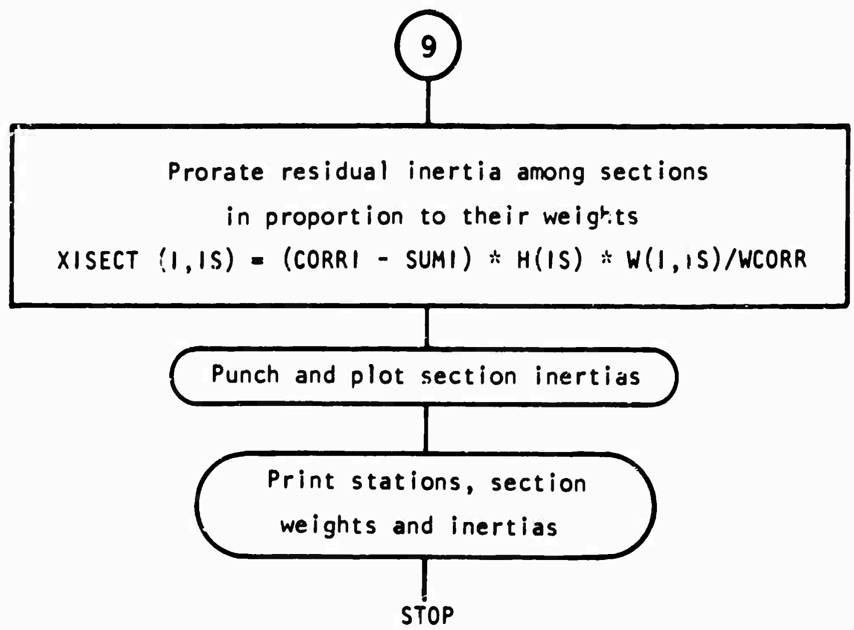

2
Compare summed distributed weight
with correct gross weight
PCTW = (WCORR - WT)/WCORR
|PCTW|-ALERR
≤ 0
4
> 0
5


5
Adjust distributed weight to
match gross weight
W(I,IS) = W(I,IS) + W(I,IS) * (PCTW)
Print summed distributed
weight and moment of
weight about given c.g.
6


4
DELM/WT I- ERRCG
≤ 0
7
> 0
Compute corrections to distributed weight to
adjust center of gravity
DELWFL = (DELM * 2)/((B(ISEGS) - A(1)) * (XCG - A(1)))
DELWRL = (DELM * 2)/((B(ISEGS) - A(1)) * (B(ISEGS) - XCG))
Apply corrections to distributed weight
to adjust center of gravity
For stations forward of c.g., W(I,IS) = W(I,IS) + DELWFL
For stations aft of c.g., W(I,IS) = W(I,IS) - DELWRL
Print DELWFL, DELWRL
8


3
Option to take summed weight and weight moment from input weight distribution as correct estimate of gross weight and c.g.
WCORR = WT
XCG = DELM/WT
8


8
Print, plot, and punch adjusted weight distribution
Sum second moment of distributed weight about center of gravity
SUMI = SUMI + (W(I,IS) * H(IS) * ((X(I,IS) - XCG) ** 2))
PRINT SUMS
ITEST
≤ 0
CORRI = SUMI
> 0
9


9
Prorate residual inertia among sections
in proportion to their weights
XISECT (I,IS) = (CORRI - SUMI) * H(IS) * W(I,IS)/WCORR
Punch and plot section inertias
Print stations, section
weights and inertias
STOP

LISTING OF WEIGHT

A FORTRAN IV or V listing of program WEIGHT and input data, as the deck was run on a Univac 1108 for the sample problem, is as follows:

```
-I FOR  WEIGHT,WEIGHT
C       MISSILE WEIGHT, C.G., AND INERTIA COMPATIBILIZER
        DIMENSION X(41,25),W(41,25),XISECT(41,25),B(25),A(25),N(25),H(25)
       1, DUMYX(41),DUMYY(41)
        DATA ((X(I,J),I=1,41),J=1,25)/1025*0.0/
   33 FORMAT  (1H0)
   32 FORMAT (1H1)
   31 FORMAT (56H0WEIGHT AND C.G. COMPUTED FROM INPUT WEIGHT DISTRIBUTIO
      1N)
   30 FORMAT (25H CENTER OF GRAVITY      = ,1PE13.6)
   29 FORMAT (25H0COMPUTED TOTAL WEIGHT = ,1PE13.6)
   28 FORMAT (16H DELTA MOMENT = ,E15.8)
   27 FORMAT (10H DELWRL = ,E15.8)
   26 FORMAT (10H DELWFL = ,E15.8)
   25 FORMAT (19H0BALANCE ADJUSTMENT)
   24 FORMAT (11H SUM W*H = ,E15.8)
   23 FORMAT (18H0WEIGHT ADJUSTMENT)
   22 FORMAT ( 8H0SUMI = ,E16.8)
   21 FORMAT (2E12.8, I6)
   20 FORMAT (I6, 34H INERTIA POINTS FELL OFF YOUR PLOT)
   19 FORMAT (I6, 33H WEIGHT POINTS FELL OFF YOUR PLOT)
   15 FORMAT (6E12.8)
   14 FORMAT (12I6)
   13 FORMAT (23H SECTION INERTIAS, SEG ,I2)
   11 FORMAT (15H WEIGHTS, SEG  ,I2)
   10 FORMAT (6E12.5)
 1011 FORMAT (25H UNADJUSTED WEIGHTS, SEG ,I2)
      READ (5,15) WCORR, XCG, CORRI, ALERR, ERRCG
      READ (5,14) ISEGS
      READ (5,21) (A(IS),B(IS),N(IS),IS = 1, ISEGS)
      READ (5,14) ITEST
      WT = 0.0
      CGERR = 0.0
      SUMI = 0.0
      DELM = 0.0
      X(1,1) = A(1)
C     COMPUTE X STATIONS
      DO 100 IS = 1, ISEGS
      FN = FLOAT (N(IS))
      H(IS) = (B(IS)-A(IS))/(FN)
      NIS = N(IS)
      DO 101  I = 2, NIS
```

```
  101 X(I,IS) = X(I-1,IS) + H(IS)
      X(NIS+1,IS) = B(IS)
      X(1, IS+1) = B(IS)
      NISP1 = N(IS) +1
  400 READ (5,15) W(1,IS), W(NISP1,IS)
      WA = W(1,IS)
      WB = W(NISP1,IS)
      AIS = A(IS)
      BIS = B(IS)
      DO 300  I = 2,NIS
      XX = X(I,IS)
      CALL ALLPTS (XX, WI, AIS, WA, BIS, WB)
  300 W(I,IS) = WI
      WRITE (6,1011) IS
      WRITE (6,10) (W(I,IS),I = 1,NISP1)
  100 CONTINUE
  204 CONTINUE
      DO 1100  IS    1, ISEGS
      NISP1 = N(     + 1
      DO 102  I= ..NISP1
  102 WT = WT + W(I,IS) * H(IS)
      WT = WT - ((W(1,IS)+W(NISP1,IS))*(H(IS)/2.0))
      DO 103  I = 1,NISP1
  103 DELM = DELM + (W(I,IS)*H(IS)*(X(I,IS) - XCG))
      DELM = DELM-((W(1,IS)*(X(1,IS)-XCG)+W(NISP1,IS)*(X(NISP1,IS)-XCG
     1))*H(IS)/2.0)
 1100 CONTINUE
C     OPTION TO ADJUST WEIGHT DISTRIBUTION OR ACCEPT INPUT DISTRIBUTION
C     AS CORRECT
      IF (ITEST) 301,301,1300
 1300 CONTINUE
C     TEST DISTRIBUTED WEIGHT AGAINST CORRECT GROSS WEIGHT
      PCTW = (WCORR - WT)/WCORR
      ABSPCT = ABS (PCTW)
      IF (ABSPCT - ALERR) 200,200,201
C     ADJUST DISTRIBUTED WEIGHT TO MATCH GROSS WEIGHT
  201 DO 202  IS = 1, ISEGS
      NISP1 = N(IS) + 1
      DO 202  I = 1,NISP1
  202 W(I,IS) = W(I,IS) + W(I,IS)*(PCTW)
      WRITE (6,23)
      WRITE (6,24) WT
      WRITE (6,28) DELM
```

```
      WT = 0.0
      DELM = 0.0
      GO TO 204
C     TEST CENTER OF DISTRIBUTED WEIGHT AGAINST CORRECT GROSS C.G.
  200 IF ((ABS(DELM/WT))-ERRCG) 1205,1205,206
  206 TERM = (DELM*2.0)/((XCG-A(1))+(B(ISEGS)-XCG))
      DELWFL = TERM / (XCG- A(1))
      DELWRL = TERM / (B(ISEGS) - XCG)
C     ADJUST WEIGHT DISTRIBUTION TO MATCH CORRECT GROSS C.G.
      DO  205  IS = 1, ISEGS
      NISP1 = N(IS) + 1
      DO 205  I = 1,NISP1
      IF (X(I,IS) - XCG) 500,501,502
  500 W(I,IS) = W(I,IS) + DELWFL
  501 GO TO 205
  502 W(I,IS) = W(I,IS) - DELWRL
  205 CONTINUE
      WRITE (6,25)
      WRITE (6,26) DELWFL
      WRITE (6,27) DELWRL
 1205 CONTINUE
      GO TO 302
  301 CONTINUE
C     INPUT WEIGHT DISTRIBUTION ACCEPTED AS CORRECT
      WCORR = WT
      XCG = XCG + DELM/WT
      WRITE (6,32)
      WRITE (6,31)
      WRITE (6,29)  WCORR
      WRITE (6,30)  XCG
      WRITE (6,32)
      PCTW = 0.0
  302 CONTINUE
      WRITE (6,33)
C     DATA TO SET UP PLOTTER FOR WEIGHT DISTRIBUTION PLOT
      READ (5, 15) XL, XR, YB, YT, DX, DY
      READ (5,14) NRT,MRT,IL,JL,NX,NY
      READ (5,14) MRKPT, LIN
      CALL CAMRAV (9)
      CALL GRID1V(1,XL,XR,YB,YT,DX,DY,NRT,MRT,-IL,-JL,NX,-NY)
      CALL PRINTV (16,16H MISSILE STATION,495,0)
      CALL APRNTV (0,-13,23,23H WEIGHT PER UNIT LENGTH,0,700)
      CALL PRINTV (16,16H TOTAL WEIGHT = , 700,1023)
      CALL LABLV (WCORR,828,1023,7,1,6)
      CALL PRINTV (15,15H MISSILE C.G.= , 700,1013)
      CALL LABLV (XCG,828,1013,7,1,4)
      CALL PRINTV (16,16H WEIGHT ERROR = ,700,1003)
      CALL LABLV (PCTW,828,1003,7,1,1)
      LINX2 = NXV(A(1))
      LINY2 = NYV(0.0)
      DO 1206 IS = 1, ISEGS
```

```
      NISP1 = N(IS) + 1
      WRITE (7,11) IS
      WRITE (7,10)(W(I,IS), I = 1,NISP1)
      IERR = 0
      DO 503  I = 1, NISP1
      DUMYX(I) = X(I,IS)
  503 DUMYY(I) = W(I,IS)
      CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      WRITE (6,19) IERR
      IF (LIN) 505,505,506
  506 NIS = N(IS)
      LINX1 = NXV(DUMYX(1))
      LINY1 = NYV(DUMYY(1))
      CALL LINEV (LINX2,LINY2,LINX1,LINY1)
      DO 507  I = 1, NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
  507 CALL LINEV(LINX1,LINY1,LINX2,LINY2)
  505 CONTINUE
      DO 104  I = 1,NISP1
  104 SUMI = SUMI + (W(I,IS)*H(IS)*((X(I,IS)-XCG)**2))
      SUMI = SUMI - (((W(1,IS)*((X(1,IS)-XCG)**2))+
     1 (W(NISP1,IS)*((X(NISP1,IS)-XCG)**2)))*(H(IS)/2.0))
 1206 CONTINUE
      WRITE (6,22) SUMI
      WRITE (6,33)
      IF (ITEST) 304,304,303
  304 CONTINUE
C     SECOND MOMENT OF DISTRIBUTED WEIGHT ACCEPTED AS TRANSVERSE
C     MOMENT OF INERTIA
      DO 305  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 305  I = 1,NISP1
  305 XISECT(I,IS) = 0.0
      GO TO 306
  303 CONTINUE
C     DATA TO SET UP PLOTTER FOR SECTION INERTIAS PLOT
      READ (5, 15) XL, XR, YB, YT, DX, DY
      READ (5,14) NRT,MRT,IL,JL,NX,NY
      READ (5,14) MRKPT, LIN
      CALL FRAMEV
      CALL GRID1V(1,XL,XR,YB,YT,DX,DY,NRT,MRT,-IL,-JL,NX,-NY)
      CALL PRINTV (16,16H MISSILE STATION,495,0)
      CALL APRNTV (0,-13,18,18H SECTION INERTIAS ,0,700)
      CALL PRINTV (17,17H TOTAL INERTIA = ,700,1000)
      CALL LABLV (CORRI,836,1000,7,1,6)
C     DISTRIBUTE INERTIA AMONG SECTIONS TO MATCH CORRECT GROSS INERTIA
C     MOMENT OF INERTIA
      LINX2 = NXV (A(1))
      LINY2 = NYV (0.0)
```

```
      DO 208  IS = 1, ISEGS
      NISP1 = N(IS) + 1
      DO 209  I = 1,NISP1
  209 XISECT(I,IS) = (CORRI-SUMI)*H(IS)*W(I,IS)/WCORR
      XISECT(1,IS) = 0.5*XISECT(1,IS)
      XISECT(NISP1,IS) = 0.5 * XISECT(NISP1,IS)
      WRITE (7,13) IS
      WRITE (7,10) (XISECT(I,IS), I = 1,NISP1)
      IERR = 0
      DO 504  I = 1, NISP1
      DUMYX(I) = X(I,IS)
  504 DUMYY(I) = XISECT(I,IS)
      CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      WRITE (6,20) IERR
      IF (LIN) 509,509,510
  510 NIS = N(IS)
      LINX1 = NXV(DUMYX(1))
      LINY1 = NYV(DUMYY(1))
      CALL LINEV (LINX2,LINY2,LINX1,LINY1)
      DO 511  I = 1, NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
  511 CALL LINEV(LINX1,LINY1,LINX2,LINY2)
  509 CONTINUE
  208 CONTINUE
  306 CONTINUE
      CALL ENDPLT
      WRITE (6,32)
      WRITE (6,16)
   16 FORMAT ( 17H ADJUSTED MISSILE)
      WRITE (6,17)
   17 FORMAT ( 68H SEG          X STATION              WEIGHT              SEC
     1TION INERTIA  )
      DO 1209 IS = 1, ISEGS
      NISP1 = N(IS) + 1
      DO 1209 I = 1, NISP1
 1209 WRITE (6,18) IS,X(I,IS),W(I,IS),XISECT(I,IS)
   18 FORMAT (I4,4X,3(1PE20.8))
      STOP
      END
-I FOR  ALLPTS,ALLPTS
      SUBROUTINE ALLPTS (X, Y, XA, YA, XB, YB )
C     LINEAR INTERPOLATION SUBROUTINE FOR FILLING IN INTERMEDIATE POINTS
C     ON LOAD DIAGRAMS
      Y = YA + ((YB-YA)/(XB-XA)) * (X - XA)
      RETURN
      END
```

```
- XQT WEIGHT
 200        +03 50        +02  12        +06 1         -03 1         -03
      7
 0          -00 25        +02     40
 25         +02 40        +02     40
 40         +02 50        +02     20
 50         +02 70        +02     40
 70         +02 90        +02     40
 90         +02 925       +02      5
 925        +02 100       +03     15
      1
 0          -00 2         +01
 2          +01 2         +01
 2          +01 2         +01
 2          +01 2         +01
 2          +01 2         +01
 2          +01 5         -00
 5          -00 5         -00
 0          -00 100       +03 0          -00 4         +01 2         +01 1         -00
      5     5       5     10       3      2
     42     1
 0          -00 100       +03 0          -00 500       +03 2         +01 5         +01
      5     2       5     20       3      3
     42     1
-    EOF
- FIN
```

INPUT DATA

Input data order and field formats are listed in the following table. FORTRAN variables may be associated with their description and use by referring back to the section on Equations. Units are user's discretion so long as they are consistent, though the pound-inch set is shown here as an example.

Data Card Arrangement and Formats

Variable order	Format
WCORR, XCG, CORRI, ALERR, ERRCG	6E12.8
ISEGS	I6
A(IS), B(IS), N(IS) Similar cards are read consecutively for each IS index, $1 \leq IS \leq ISEGS$	2E12.8, I6
ITEST	I6
W(1,IS), W(NISP1, IS) Similar cards are read consecutively for each IS index, IS = 1,ISEGS. These are the running weights at segment end points, A(IS) and B(IS). NISP1 = N(IS) + 1	2E12.8

Variable order	Format
XL, XR, YB, YT, DX, DY Plot grid specifications for distributed weight plot.[a]	6E12.8
NRT, MRT, IL, JL, NX, NY Plot grid specifications for distributed weight plot.[a]	12I6
MRKPT, LIN Plot specifications for distributed weight plot.[a]	12I6
XL, XR, YB, YT, DX, DY Plot grid specification for distributed section inertias plot.[a] Omit if ITEST $\leq$ 0.	6E12.8
NRT, MRT, IL, JL, NX, NY Plot grid specifications for distributed section inertias plot.[a] Omit if ITEST $\leq$ 0.	12I6
MRKPT, LIN Plot specifications for distributed section inertias plot.[a] Omit if ITEST $\leq$ 0.	12I6

[a]Plot grid specifications are for NWC's Stromberg-Carlson 4020 plotter and associated subroutines. NWC users should consult SC 4020 manuals and note how these variables are used in the listing. The user at other installations will probably need to modify these segments of the program to suit his own installation.

OUTPUT DATA

Program WEIGHT produces plotted, printed, and punched card output as follows.

Plotted Output

1. W(I,IS) versus X(I,IS)

2. XISECT (I,IS) versus X(I,IS)

   (If ITEST > 0)

Printed Output

1. IS, a segment label for following x stations.

2. X(I,IS), all x stations delimiting intervals.

3. IS, a segment label for following running weight data.

4. Unadjusted W(I,IS), running weight values interpolated directly from input data.

5. A message indicating a pass through the summed weight adjuster loop--i.e., "WEIGHT ADJUSTMENT."

6. The current summed products of running weight and segment intervals--i.e., WT--resulting from the last weight adjustment.

7. The current summed first moment of running weight resulting from the last weight adjustment, DELM.

8. A message labeling adjustments to running weight to follow.

9. Values of adjustments applied forward and aft of the true center of gravity for proper balance. DELWRL and DELWFL.

10. If ITEST $\leq$ 0, denoting that original running weight data are to be taken as correct, the computed summed weight and center of gravity are printed.

11. A message warning of improper plotter scaling.

    "(IERR) WEIGHT POINTS FELL OFF YOUR PLOT."

12. The summed second moment of weight about the center of gravity, SUMI.

13. A message warning of improper plotter scaling.

    "(IERR) INERTIA POINTS FELL OFF YOUR PLOT."

14. A tabulation of the final adjusted distributed weight and section inertias.

Punched Card Output

1. IS, a segment label for following running weight data. This card will have on it the word "WEIGHTS" preceding the segment label.

2. Running weight, punched in 6E12.5 format for later input into a succeeding program.

3. IS, a segment label for following section inertia data. This card will have on it the words "SECTION INERTIAS" preceding the segment label.

4. Section inertias, punched in 6E12.5 format for later input into a succeeding program.

Sample Output

Following is the output produced by running sample problem data. Printer output, a listing of the output data cards, and Stromberg-Carlson 4020 plots are shown. Adjustments to the sample store's distributed weights are evident from comparison of the distributed weight plot with the input data (Appendix A, Fig. A-2).

```
UNADJUSTED WEIGHTS, SEG  1
  .00000      .50000-01   .10000+00   .15000-00   .20000-00   .25000-00
  .30000-00   .35000-00   .40000-00   .45000-00   .50000-00   .55000-00
  .60000-00   .65000-00   .70000-00   .75000-00   .80000-00   .85000-00
  .90000-00   .95000-00   .10000+01   .10500+01   .11000+01   .11500+01
  .12000+01   .12500+01   .13000+01   .13500+01   .14000+01   .14500+01
  .15000+01   .15500+01   .16000+01   .16500+01   .17000+01   .17500+01
  .18000+01   .18500+01   .19000+01   .19500+01   .20000+01
UNADJUSTED WEIGHTS, SEG  2
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
UNADJUSTED WEIGHTS, SEG  3
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01
UNADJUSTED WEIGHTS, SEG  4
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
```

```
UNADJUSTED WEIGHTS, SEG  5
  .20000+01    20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
  .20000+01   .20000+01   .20000+01   .20000+01   .20000+01
UNADJUSTED WEIGHTS, SEG  6
  .20000+01   .17000+01   .14000+01   .11000+01   .80000-00   .50000-00
UNADJUSTED WEIGHTS, SEG  7
  .50000-00   .50000-00   .50000-00   .50000-00   .50000-00   .50000-00
  .50000-00   .50000-00   .50000-00   .50000-00   .50000-00   .50000-00
  .50000-00   .50000-00   .50000-00   .50000-00

WEIGHT ADJUSTMENT
SUM W*H =     .16187499+03
DELTA MOMENT =     .44329701+03

WEIGHT ADJUSTMENT
SUM W*H =     .19273231+03
DELTA MOMENT =     .52780034+03

WEIGHT ADJUSTMENT
SUM W*H =     .19973584+03
DELTA MOMENT =     .54697963+03

BALANCE ADJUSTMENT
DELWFL =     .21908092-00

DELWRL =     .21908092-00


    0 WEIGHT POINTS FELL OFF YOUR PLOT
    0 WEIGHT POINTS FELL OFF YOUR PLOT
    0 WEIGHT POINTS FELL OFF YOUR PLOT
    0 WEIGHT POINTS FELL OFF YOUR PLOT
    0 WEIGHT POINTS FELL OFF YOUR PLOT
    0 WEIGHT POINTS FELL OFF YOUR PLOT
    0 WEIGHT POINTS FELL OFF YOUR PLOT

SUMI =     .11739253+06


    0 INERTIA POINTS FELL OFF YOUR PLOT
    0 INERTIA POINTS FELL OFF YOUR PLOT
    0 INERTIA POINTS FELL OFF YOUR PLOT
    0 INERTIA POINTS FELL OFF YOUR PLOT
    0 INERTIA POINTS FELL OFF YOUR PLOT
    0 INERTIA POINTS FELL OFF YOUR PLOT
    0 INERTIA POINTS FELL OFF YOUR PLOT
```

ADJUSTED MISSILE

SEG	X STATION	WEIGHT	SECTION INERTIA
1	0.00000000	2.19080920-01	8.92572580-01
1	6.25000000-01	2.80856930-01	2.28851680+00
1	1.25000000+00	3.42632940-01	2.79188860+00
1	1.87500000+00	4.04408950-01	3.29526030+00
1	2.50000000+00	4.66184960-01	3.79863200+00
1	3.12500000+00	5.27960960-01	4.30200370+00
1	3.75000000+00	5.89736980-01	4.80537540+00
1	4.37500000+00	6.51512990-01	5.30874710+00
1	5.00000000+00	7.13288990-01	5.81211890+00
1	5.62500000+00	7.75065000-01	6.31549050+00
1	6.25000000+00	8.36841010-01	6.81886240+00
1	6.87500000+00	8.98617010-01	7.32223410+00
1	7.50000000+00	9.60393030-01	7.82560570+00
1	8.12500000+00	1.02216903+00	8.32897760+00
1	8.75000000+00	1.08394505+00	8.83234930+00
1	9.37500000+00	1.14572104+00	9.33572090+00
1	1.00000000+01	1.20749706+00	9.83909260+00
1	1.06250000+01	1.26927307+00	1.03424644+01
1	1.12500000+01	1.33104906+00	1.08458359+01
1	1.18750000+01	1.39282509+00	1.13492079+01
1	1.25000000+01	1.45460109+00	1.18525794+01
1	1.31250000+01	1.51637712+00	1.23559513+01
1	1.37500000+01	1.57815310+00	1.28593228+01
1	1.43750000+01	1.63992911+00	1.33626946+01
1	1.50000000+01	1.70170512+00	1.38660663+01
1	1.56250000+01	1.76348114+00	1.43694381+01
1	1.62499990+01	1.82525715+00	1.48728099+01
1	1.68750000+01	1.88703316+00	1.53761816+01
1	1.75000000+01	1.94880917+00	1.58795532+01
1	1.81250000+01	2.01058510+00	1.63829240+01
1	1.87500000+01	2.07236110+00	1.68862960+01
1	1.93749990+01	2.13413720+00	1.73896690+01
1	2.00000000+01	2.19591320+00	1.78930390+01
1	2.06250000+01	2.25768920+00	1.83964110+01
1	2.12500000+01	2.31946520+00	1.88997830+01
1	2.18750000+01	2.38124120+00	1.94031540+01
1	2.24999990+01	2.44301720+00	1.99065270+01
1	2.31250000+01	2.50479320+00	2.04098980+01
1	2.37500000+01	2.56656920+00	2.09132700+01
1	2.43750000+01	2.62834520+00	2.14166420+01
1	2.50000000+01	2.69012130+00	1.09600070+01
2	2.50000000+01	2.69012130+00	6.57600420+00
2	2.53750000+01	2.69012130+00	1.31520083+01
2	2.57499990+01	2.69012130+00	1.31520083+01
2	2.61250000+01	2.69012130+00	1.31520083+01
2	2.64999990+01	2.69012130+00	1.31520083+01
2	2.68750000+01	2.69012130+00	1.31520083+01
2	2.72499990+01	2.69012130+00	1.31520083+01
2	2.76250000+01	2.69012130+00	1.31520083+01
2	2.79999990+01	2.69012130+00	1.31520083+01
2	2.83750000+01	2.69012130+00	1.31520083+01
2	2.87499990+01	2.69012130+00	1.31520083+01
2	2.91250000+01	2.69012130+00	1.31520083+01
2	2.94999990+01	2.69012130+00	1.31520083+01
2	2.98750000+01	2.69012130+00	1.31520083+01

2	3.02499990+01	2.69012130+00	1.31520083+01
2	3.06250000+01	2.69012130+00	1.31520083+01
2	3.09999990+01	2.69012130+00	1.31520083+01
2	3.13750000+01	2.69012130+00	1.31520083+01
2	3.17500000+01	2.69012130+00	1.31520083+01
2	3.21250000+01	2.69012130+00	1.31520083+01
2	3.25000000+01	2.69012130+00	1.31520083+01
2	3.28750000+01	2.69012130+00	1.31520083+01
2	3.32500000+01	2.69012130+00	1.31520083+01
2	3.36250000+01	2.69012130+00	1.31520083+01
2	3.40000000+01	2.69012130+00	1.31520083+01
2	3.43750000+01	2.69012130+00	1.31520083+01
2	3.47500000+01	2.69012130+00	1.31520083+01
2	3.51250000+01	2.69012130+00	1.31520083+01
2	3.55000000+01	2.69012130+00	1.31520083+01
2	3.58749990+01	2.69012130+00	1.31520083+01
2	3.62500000+01	2.69012130+00	1.31520083+01
2	3.66249990+01	2.69012130+00	1.31520083+01
2	3.70000000+01	2.69012130+00	1.31520083+01
2	3.73749990+01	2.69012130+00	1.31520083+01
2	3.77500000+01	2.69012130+00	1.31520083+01
2	3.81249990+01	2.69012130+00	1.31520083+01
2	3.85000000+01	2.69012130+00	1.31520083+01
2	3.88749990+01	2.69012130+00	1.31520083+01
2	3.92500000+01	2.69012130+00	1.31520083+01
2	3.96249990+01	2.69012130+00	1.31520083+01
2	4.00000000+01	2.69012130+00	6.57600420+00
3	4.00000000+01	2.69012130+00	8.76800560+00
3	4.04999990+01	2.69012130+00	1.75360110+01
3	4.10000000+01	2.69012130+00	1.75360110+01
3	4.15000000+01	2.69012130+00	1.75360110+01
3	4.19999990+01	2.69012130+00	1.75360110+01
3	4.25000000+01	2.69012130+00	1.75360110+01
3	4.30000000+01	2.69012130+00	1.75360110+01
3	4.34999990+01	2.69012130+00	1.75360110+01
3	4.40000000+01	2.69012130+00	1.75360110+01
3	4.45000000+01	2.69012130+00	1.75360110+01
3	4.50000000+01	2.69012130+00	1.75360110+01
3	4.55000000+01	2.69012130+00	1.75360110+01
3	4.59999990+01	2.69012130+00	1.75360110+01
3	4.65000000+01	2.69012130+00	1.75360110+01
3	4.70000000+01	2.69012130+00	1.75360110+01
3	4.74999990+01	2.69012130+00	1.75360110+01
3	4.80000000+01	2.69012130+00	1.75360110+01
3	4.85000000+01	2.69012130+00	1.75360110+01
3	4.89999990+01	2.69012130+00	1.75360110+01
3	4.95000000+01	2.69012130+00	1.75360110+01
3	5.00000000+01	2.47104030+00	8.05394760+00
4	5.00000000+01	2.47104030+00	8.05394760+00
4	5.05000000+01	2.25195940+00	1.46797791+01
4	5.10000000+01	2.25195940+00	1.46797791+01
4	5.14999990+01	2.25195940+00	1.46797791+01
4	5.20000000+01	2.25195940+00	1.46797791+01
4	5.25000000+01	2.25195940+00	1.46797791+01
4	5.29999990+01	2.25195940+00	1.46797791+01
4	5.35000000+01	2.25195940+00	1.46797791+01
4	5.40000000+01	2.25195940+00	1.46797791+01
4	5.44999990+01	2.25195940+00	1.46797791+01

4	5.50000000+01	2.25195940+00	1.46797791+01
4	5.55000000+01	2.25195940+00	1.46797791+01
4	5.59999990+01	2.25195940+00	1.46797791+01
4	5.65000000+01	2.25195940+00	1.46797791+01
4	5.70000000+01	2.25195940+00	1.46797791+01
4	5.75000000+01	2.25195940+00	1.46797791+01
4	5.80000000+01	2.25195940+00	1.46797791+01
4	5.84999990+01	2.25195940+00	1.46797791+01
4	5.90000000+01	2.25195940+00	1.46797791+01
4	5.95000000+01	2.25195940+00	1.46797791+01
4	5.99999990+01	2.25195940+00	1.46797791+01
4	6.05000000+01	2.25195940+00	1.46797791+01
4	6.10000000+01	2.25195940+00	1.46797791+01
4	6.14999990+01	2.25195940+00	1.46797791+01
4	6.20000000+01	2.25195940+00	1.46797791+01
4	6.25000000+01	2.25195940+00	1.46797791+01
4	6.30000000+01	2.25195940+00	1.46797791+01
4	6.35000000+01	2.25195940+00	1.46797791+01
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Punched Card Output

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 .22520+01   .22520+01   .22520+01   .22520+01   .22520+01
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WEIGHTS, SEG  7
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 .39868-00   .39868-00   .39868-00   .39868-00
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SECTION INERTIAS, SEG  6
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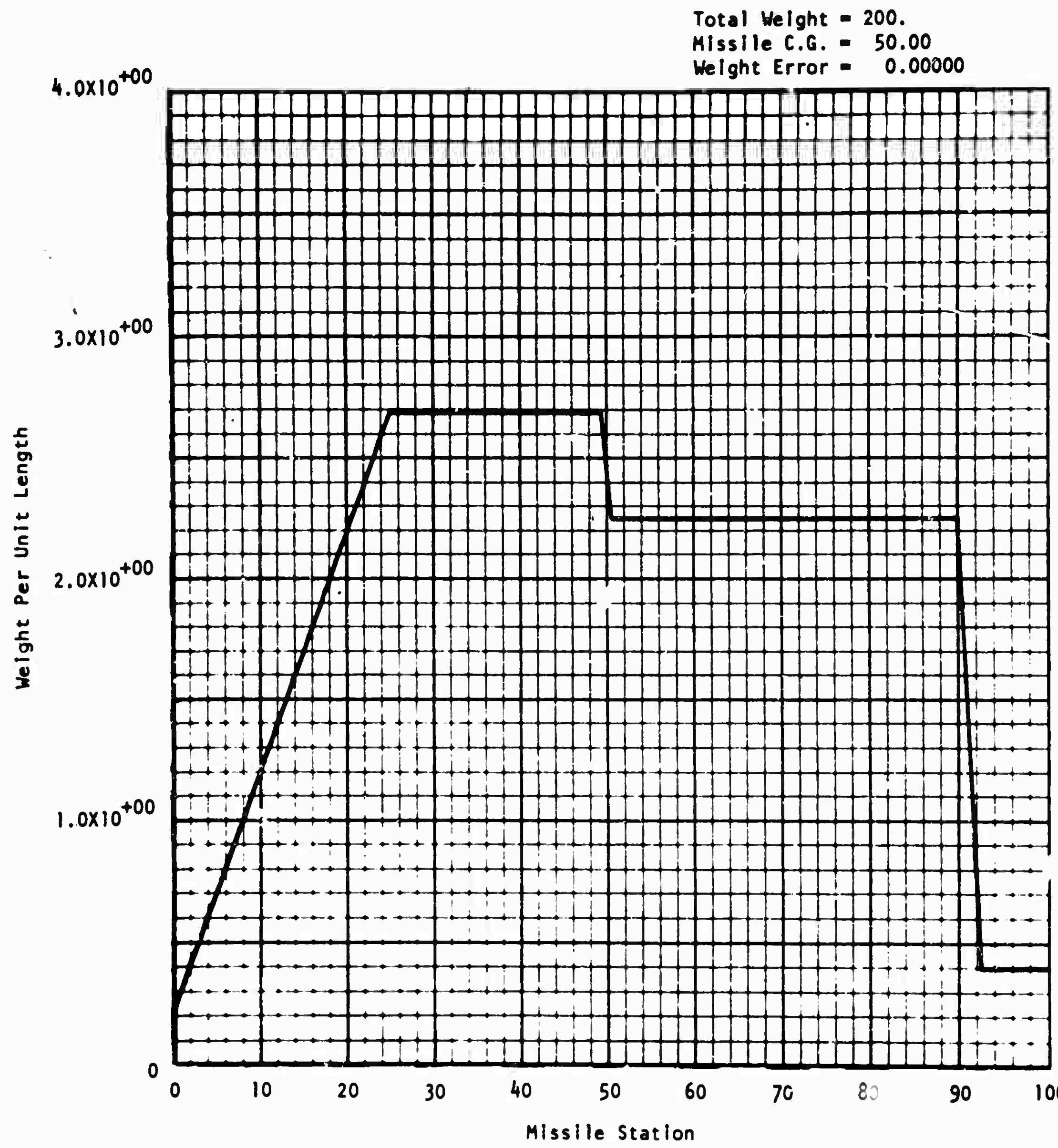
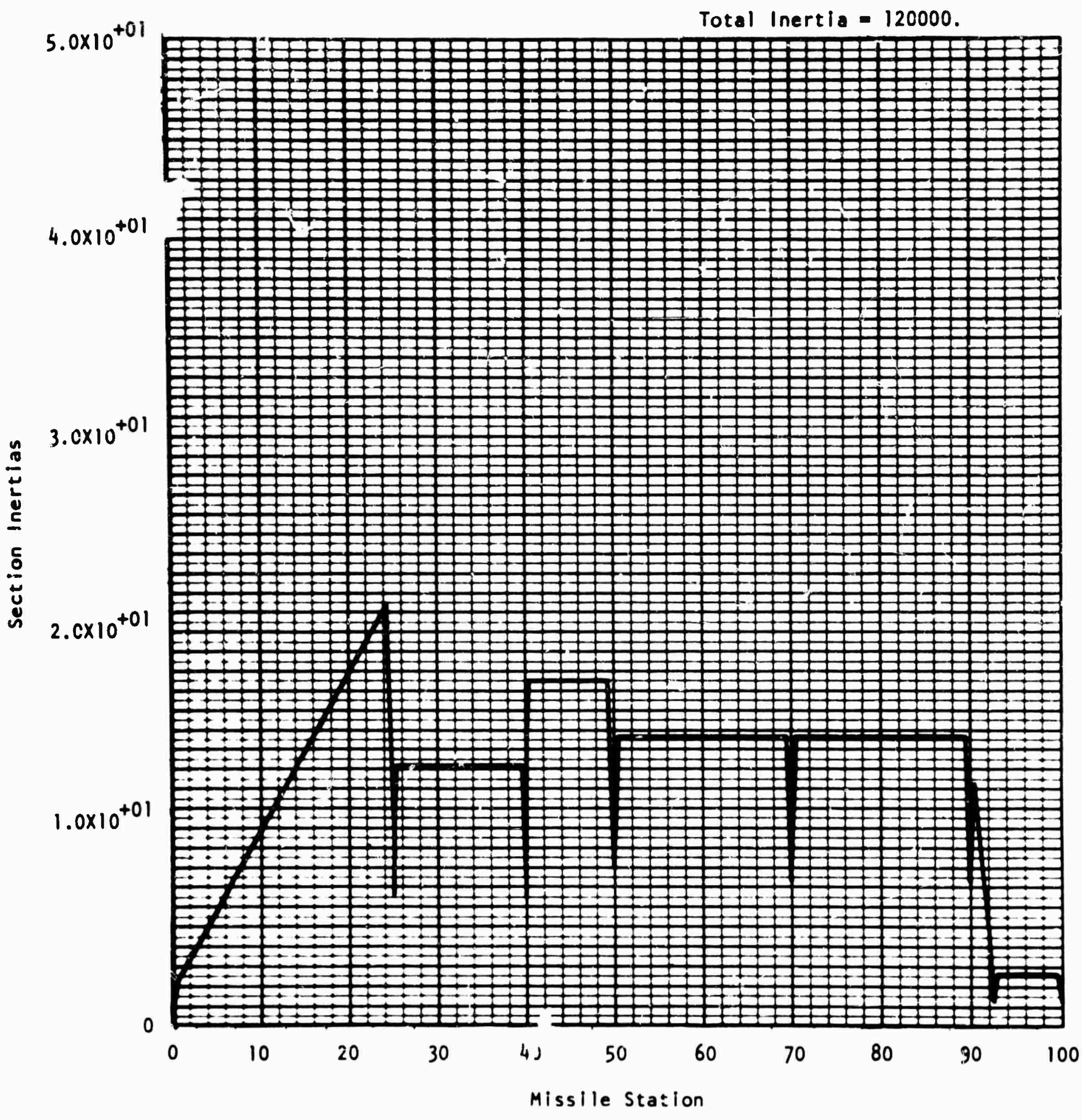


S-C 4020 Plotter Output


Total Inertia = 120000.
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4.0X10+01
3.0X10+01
2.0X10+01
1.0X10+01
0
Section Inertias
0
10
20
30
40
50
60
70
80
90
100
Missile Station

PROGRAM MAIN

Repetitious or similar tasks were coded as subroutines. MAIN serves as a master program for these worker subroutines by accepting input data and presenting them to the subroutines in a proper order. A few arithmetic operations are done in MAIN, although these are mostly "bookkeeping" tasks.

MAIN is the program of first entry, and access to it is accomplished by means peculiar to the computer used. The following pertains to a Sperry-Rand Univac 1108 operating under EXEC II (Ref. 2). To date, there are two different hanger loads routines with the same name--the one to be used is determined at execute time by adding a flag on the system control XQT card which references MAIN. Examples of each of the two flags are included in the sample problems, and their meanings are discussed further under SUBROUTINE HANGER (both versions).

SYMBOLS AND UNITS FOR MAIN

Algebraic symbol	FORTRAN equivalent	Definition
A	A(IS)	The forward end station of a segment (inches)
a.c.	ARC	Aerodynamic reference center, point about which aerodynamic moments are given (x station, inches)
B	B(IS)	The aft end station of a segment (inches)--note that for an intermediate segment other than the nose or tail, B(IS) = A(IS + 1)
b	BHANGR	Distance between aft hanger rail hooks (inches) (used only for A-flagged SUBROUTINE HANGER)
$\bar{c}$	CBAR	Reference length, for aerodynamic moment coefficients (inches)
c or h_d	HDC	Vertical distance between upper surface of store and a line on the crossbar of a lug where fore and aft load is reacted for B-flagged SUBROUTINE HANGER, or height of detent above store longitudinal axis for A-flagged SUBROUTINE HANGER (inches)
C_L	CL	Gross aerodynamic lift coefficient
C_m	CM	Gross aerodynamic pitching moment coefficient

Algebraic symbol	FORTRAN equivalent	Definition
C_Y	CY	Gross aerodynamic side force coefficient
C_n	CN	Gross aerodynamic yawing moment coefficient
C_D	CD	Gross aerodynamic drag coefficient
C_{L_α}	CLA	Gross aerodynamic lift curve slope (per deg)
C_{m_α}	CMA	Gross aerodynamic pitching moment coefficient slope (per inch per deg)
C_{Y_β}	CYB	Gross aerodynamic side force coefficient slope (per deg)
C_{n_β}	CNB	Gross aerodynamic yawing moment coefficient slope (per deg per inch)
ΔC_p	DELCP(I,IS)	Distributed aerodynamic pressure coefficient imbalance at opposite sides of a body station
d	D(I,IS)	Local diameter as a function of x (inches)
e or h_r	HRE	Vertical distance between the store center of gravity and the intersection of the lines of action of the sway braces for B-flagged SUBROUTINE HANGER, or height of rear hanger from store longitudinal axis for A-flagged SUBROUTINE HANGER (inches)
h_f or h	HFH	Height of forward hanger from store longitudinal axis for A-flagged SUBROUTINE HANGER, or vertical distance between upper surface of the store and the point on the lug where a side load reaction may be provided for B-flagged SUBROUTINE HANGER (inches)
h_r or e	HRE	Height of rear hanger from store longitudinal axis for A-flagged SUBROUTINE HANGER, or vertical distance between the store center of gravity and the intersection of the lines of action of the sway braces for B-flagged SUBROUTINE HANGER (inches)

Algebraic symbol	FORTRAN equivalent	Definition
h_d or c	HDC	Height of detent above store longitudinal axis for A-flagged SUBROUTINE HANGER, or vertical distance between upper surface of store and a line on the crossbar of a lug where fore and aft load is reacted for B-flagged SUBROUTINE HANGER (inches)
I_o	CORRI	Transverse gross moment of inertia (lb-in^2)
$I_{sect}(x)$	XISECT (I,IS)	Transverse inertia attributed to elemental sections (lb-in^2)
M(x)	XM	Distributed moment, moment at a station x (lb-in)
n_x	GX	Longitudinal linear acceleration (gravity units)
n_y	GY	Lateral linear acceleration (gravity units)
n_z	GZ	Normal linear acceleration (gravity units)
r	RAD	Radius of store (inches)
S	S	Reference area, for aerodynamic coefficients (in^2)
S(x)	SHEAR (I,IS)	Distributed shear, shear at a station x (lb)
V	V	True airspeed (ft/sec)
w(x)	W(I,IS)	Running weight distribution, weight per unit length as a function of x (lb/in)
W_T	WT	Gross weight (lb)
x	X	Station along store longitudinal axis (inches)
x_{cg}	XCG	Center of gravity station (inches)
Δx, h	U(IS)	Incremental x stations, section thickness (inches)
	AERO(I,IS)	Distributed aerodynamic force along store body due to ΔC_p
	FHSTA	Forward hanger station (inches)

Algebraic symbol	FORTRAN equivalent	Definition
	FSBSTA	Forward sway brace station (inches)
	FINCLA(J)	Aerodynamic force curve slope of fin (per deg); subscript J = 1 for vertical force (lift); J = 2 for lateral force (side force)
	FINCMA(J)	Aerodynamic moment curve slope for fin (per deg per inch); subscript J = 1 for pitching moment; J = 2 for yawing moment
	ISFIN	IS segment at the aft end of which the fin aerodynamic forces and moments are concentrated
	ISWING	IS segment at the aft end of which the wing aerodynamic forces and moments are concentrated
	IBATCH	A computational run number included with output data for identification--if negative or zero, normal exit occurs
	ISEGS	Number of segments store is broken up into (a convenient choice determined by location of some discontinuity of property or geometry)
	ISFHGR	IS segment whose aft end is at the forward hanger
	ISRHGR	IS segment whose aft end is at the rear hanger
	ISFSB	IS segment whose aft end is at the forward sway brace
	ISRSB	IS segment whose aft end is at the rear sway brace
	ISDTNT	IS segment whose aft end is at the detent (used only for A-flagged HANGER)
	N(IS)	Number of sections a segment is broken into
	NOPT(IS)	Designates whether the diameter (D) and ΔC_p associated with an IS segment are to be read individually, or are to be linearly interpolated between values given at end points

Algebraic symbol	FORTRAN equivalent	Definition
	RHSTA	Rear hanger station (inches)
	RSBSTA	Rear sway brace station (inches)
	WNGCLA(J)	Aerodynamic force curve slope of wing (per deg); subscript J = 1 for vertical force (lift); J = 2 for lateral force (side force)
	WNGCMA(J)	Aerodynamic moment curve slope for wing (per deg per inch); subscript J = 1 for pitching moment; J = 2 for yawing moment
α	ALPHA	Aircraft angle of attack (deg)
α_1	ALPHAP	Angle of attack of store comprised of aircraft angles of attack and sideslip components transformed through cant angle (deg)
α_R	RALPHA	Reference angle of attack associated with distributed pressure coefficient data used (deg)
β	BETA	Aircraft angle of sideslip (deg)
β_1	BETAP	Angle of sideslip of store comprised of aircraft angles of attack and sideslip components transformed through cant angles (deg)
β_a	BETAA	Aft sway brace angle (deg) (used by B-flagged HANGER)
β_f	BETAF	Forward sway brace angle (deg) (used by B-flagged HANGER)
γ	CANT	Cant angle (deg)
$\ddot{\theta}$	D2THE	Pitch angular acceleration (rad/sec^2)
ρ	RHO	Atmospheric density (slug/ft^3)
$\ddot{\psi}$	D2PSI	Yaw angle acceleration (rad/sec^2)

EQUATIONS

Since MAIN functions as an executive program for other worker subroutines, there are few significant manipulations performed in it. These few are briefly described in this section.

Rather than read in x stations corresponding with the various sections, the incremental section thicknesses are first computed from the input end stations of a segment and the number of sections that segment is to be broken into.

$$\Delta x = h = (B - A)/N$$

The x stations are then summed,

$$x_i = x_{i-1} + \Delta x$$

Both hanger loads routines were previously written presuming that load conditions specified by MIL-A-8591C would be given relative to the store plane of symmetry. Such is not the case for canted stores, so a coordinate rotation is performed to account for cant. It was easier to perform this transformation on angles of attack and sideslip in MAIN before entering SUBROUTINE HANGER. Obeying sign conventions used herein, the cant angle transformation is

$$\alpha_1 = \alpha \cos \gamma + \beta \sin \gamma$$

$$\beta_1 = \beta \cos \gamma - \alpha \sin \gamma$$

which computes flow angles imposed on a store due to aircraft angle of attack and sideslip, α and β, the store being canted relative to the aircraft through an angle γ. These transformed angles of attack and sideslip are subsequently multiplied by aerodynamic force and moment coefficient slopes to obtain gross coefficient values

$$C_L = C_{L_\alpha} \cdot \alpha_1 \qquad C_Y = C_{Y_\beta} \cdot \beta_1$$

$$C_m = C_{m_\alpha} \cdot \alpha_1 \qquad C_n = C_{n_\beta} \cdot \beta_1$$

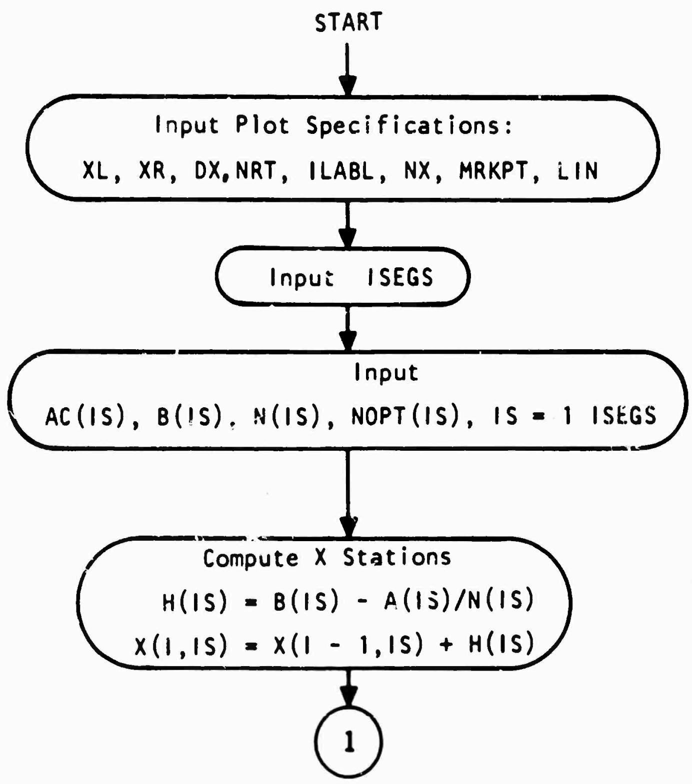
which are presented to SUBROUTINE HANGER.

The only remaining arithmetic manipulations in MAIN worthy of mention are the uses of FORTRAN IV complex arithmetic functions to combine quadrature components of shear and moment into resultants. Just after subroutine SMDIAG is called upon to produce distributed shears and bending moments in one plane, that plane's components are stored in one of the two parts of the complex variables, CXS(I,IS) and CXM(I,IS). Symmetry plane components of shears and moments are stored in the real parts of CXS(I,IS) and CXM(I,IS), and lateral plane components are stored in the imaginary parts.

Occasionally, aerodynamics are ignored when computing carriage loads. When such an omission is appropriate, an option is available in MAIN to avoid having to read in data associated with aerodynamics. If S (the aerodynamic reference area) is read in as zero, all input data associated with aerodynamics are omitted, the subroutine that generates distributed aerodynamic loads is skipped, and all distributed and concentrated aerodynamic force terms presented to remaining subroutines are zeroed automatically.

The sequence in which all the above procedures are performed and in which worker subroutines are called may be seen in the flow chart. Note that after subroutine HANGER is called upon to produce hanger load components, all load components are accumulated in the symmetry (vertical) plane first, and then in the lateral plane. In so treating the vertical and lateral load components separately, these loads are integrated into vertical and lateral shear and moment diagrams. Treating orthogonal components separately allows reuse of all loads accumulation subroutines.

FLOW CHART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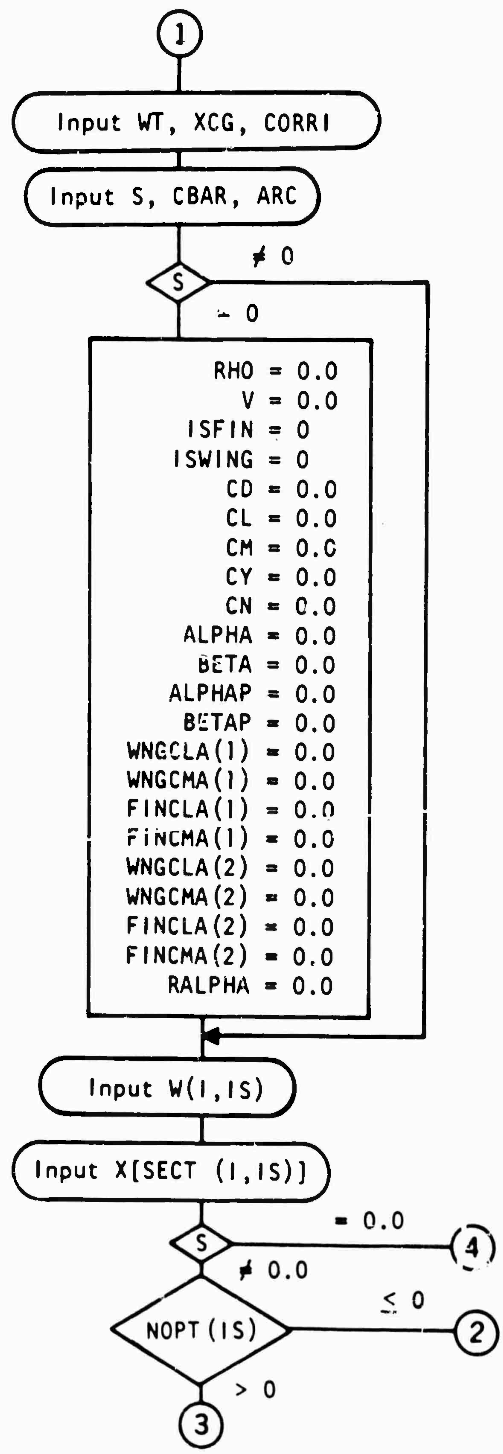
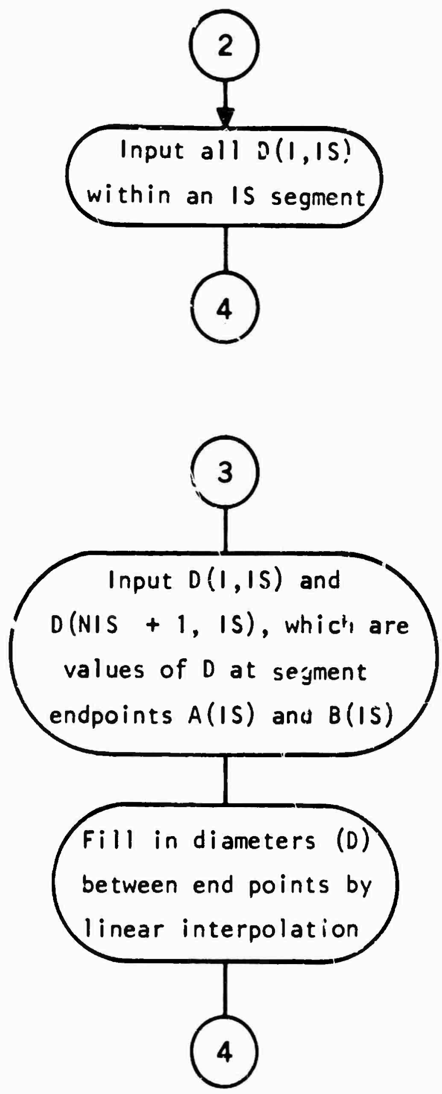
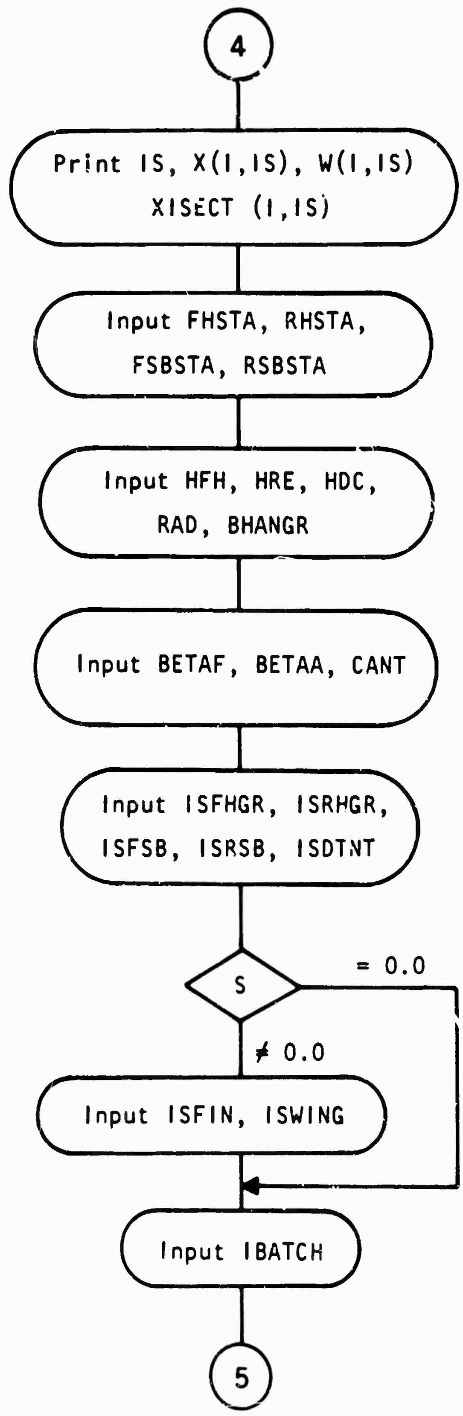
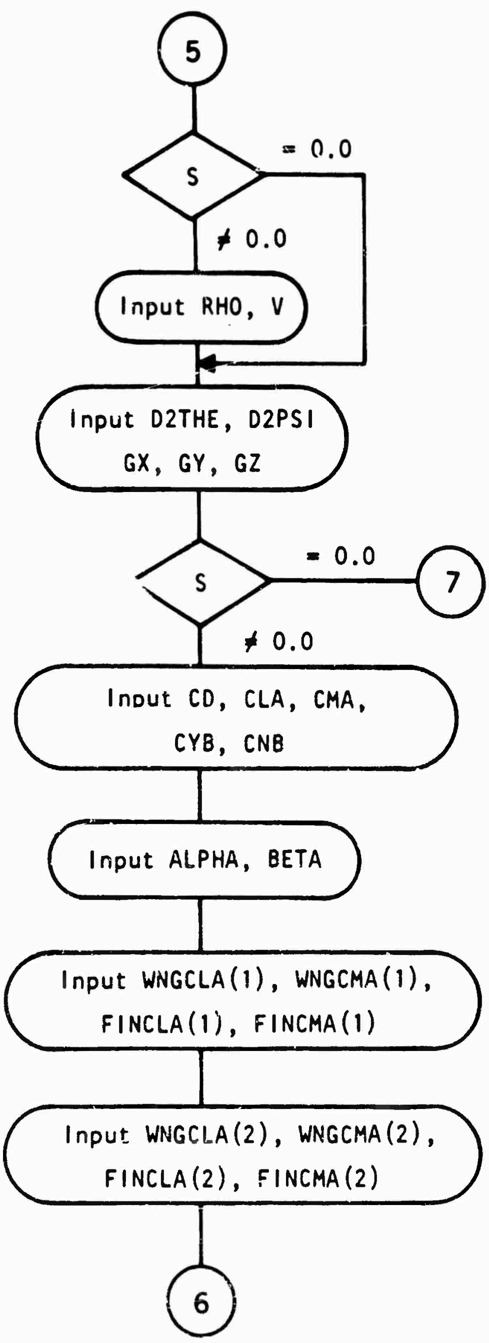
XL, XR, DX, NRT, ILABL, NX, MRKPT, LIN
Input ISEGS
Input
AC(IS), B(IS), N(IS), NOPT(IS), IS = 1 ISEGS
Compute X Stations
H(IS) = B(IS) - A(IS)/N(IS)
X(I,IS) = X(I - 1,IS) + H(IS)
1


1
Input WT, XCG, CORRI
Input S, CBAR, ARC
≠ 0
S
= 0
RHO = 0.0
V = 0.0
ISFIN = 0
ISWING = 0
CD = 0.0
CL = 0.0
CM = 0.0
CY = 0.0
CN = 0.0
ALPHA = 0.0
BETA = 0.0
ALPHAP = 0.0
BETAP = 0.0
WNGCLA(1) = 0.0
WNGCMA(1) = 0.0
FINCLA(1) = 0.0
FINCMA(1) = 0.0
WNGCLA(2) = 0.0
WNGCMA(2) = 0.0
FINCLA(2) = 0.0
FINCMA(2) = 0.0
RALPHA = 0.0
Input W(I,IS)
Input X[SECT (I,IS)]
= 0.0
S
4
≠ 0.0
≤ 0
NOPT(IS)
2
> 0
3


2
Input all D(I,IS) within an IS segment
4
3
Input D(I,IS) and D(NIS + 1, IS), which are values of D at segment endpoints A(IS) and B(IS)
Fill in diameters (D) between end points by linear interpolation
4


4
Print IS, X(I,IS), W(I,IS)
XISECT (I,IS)
Input FHSTA, RHSTA,
FSBSTA, RSBSTA
Input HFH, HRE, HDC,
RAD, BHANGR
Input BETAF, BETAA, CANT
Input ISFHGR, ISRHGR,
ISFSB, ISRSB, ISDTNT
S
= 0.0
≠ 0.0
Input ISFIN, ISWING
Input IBATCH
5


5
S
= 0.0
≠ 0.0
Input RHO, V
Input D2THE, D2PSI
GX, GY, GZ
S
= 0.0
7
≠ 0.0
Input CD, CLA, CMA,
CYB, CNB
Input ALPHA, BETA
Input WNGCLA(1), WNGCMA(1),
FINCLA(1), FINCMA(1)
Input WNGCLA(2), WNGCMA(2),
FINCLA(2), FINCMA(2)
6

6

Transform angles of attack and sideslip through a rotation due to cant angle of store relative to aircraft.

ALPHAP = ALPHA * COS (CANT) + BETA * SIN (CANT)

BETAP = BETA * COS (CANT) - ALPHA * SIN (CANT)

(Note: Cant, input in degrees, is converted to radians so that the FORTRAN sin and cos will function properly.)

Multiply aerodynamic coefficient slopes by transformed angles of attack and sideslip.

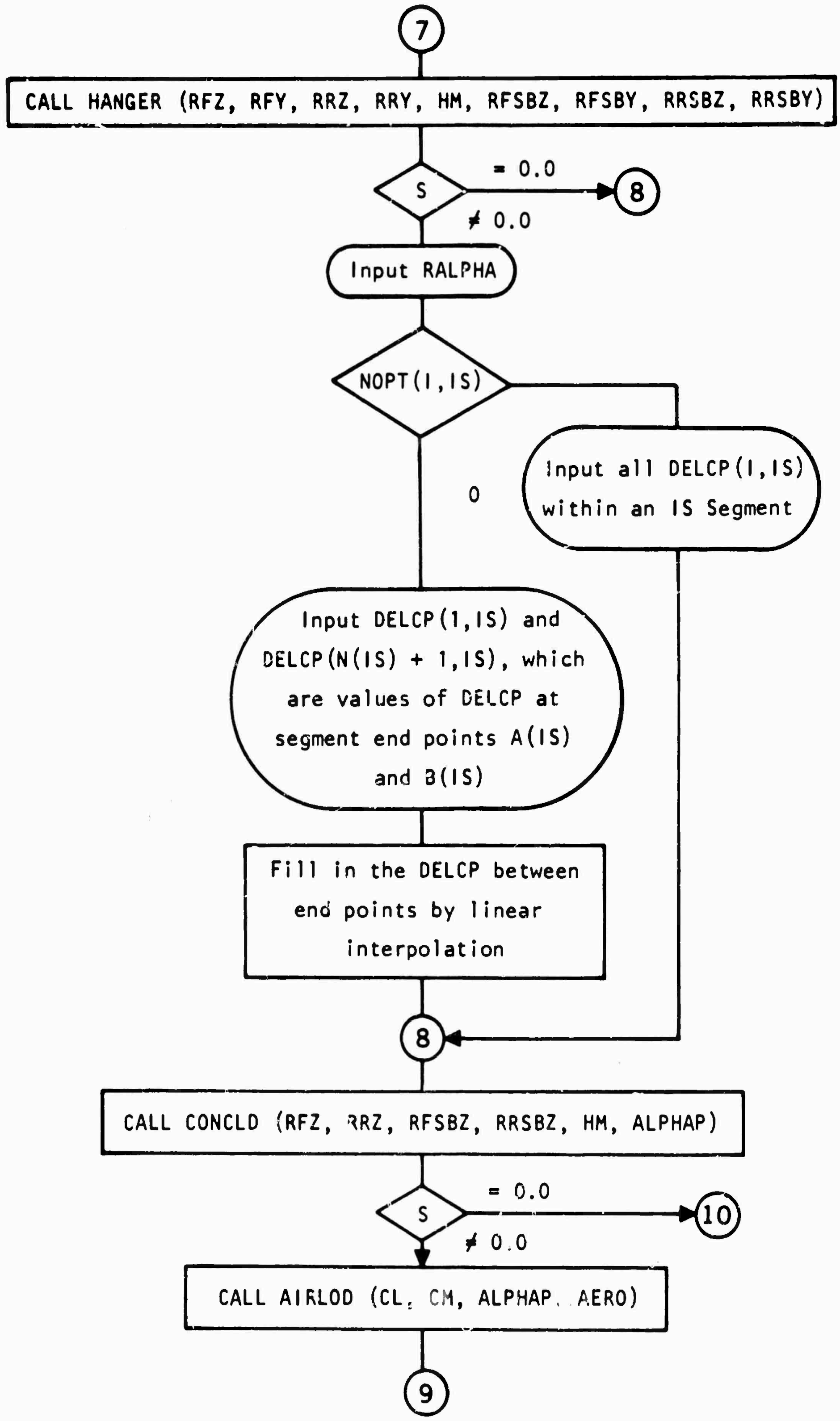
CL = CLA * ALPHAP

CM = CMA * ALPHAP

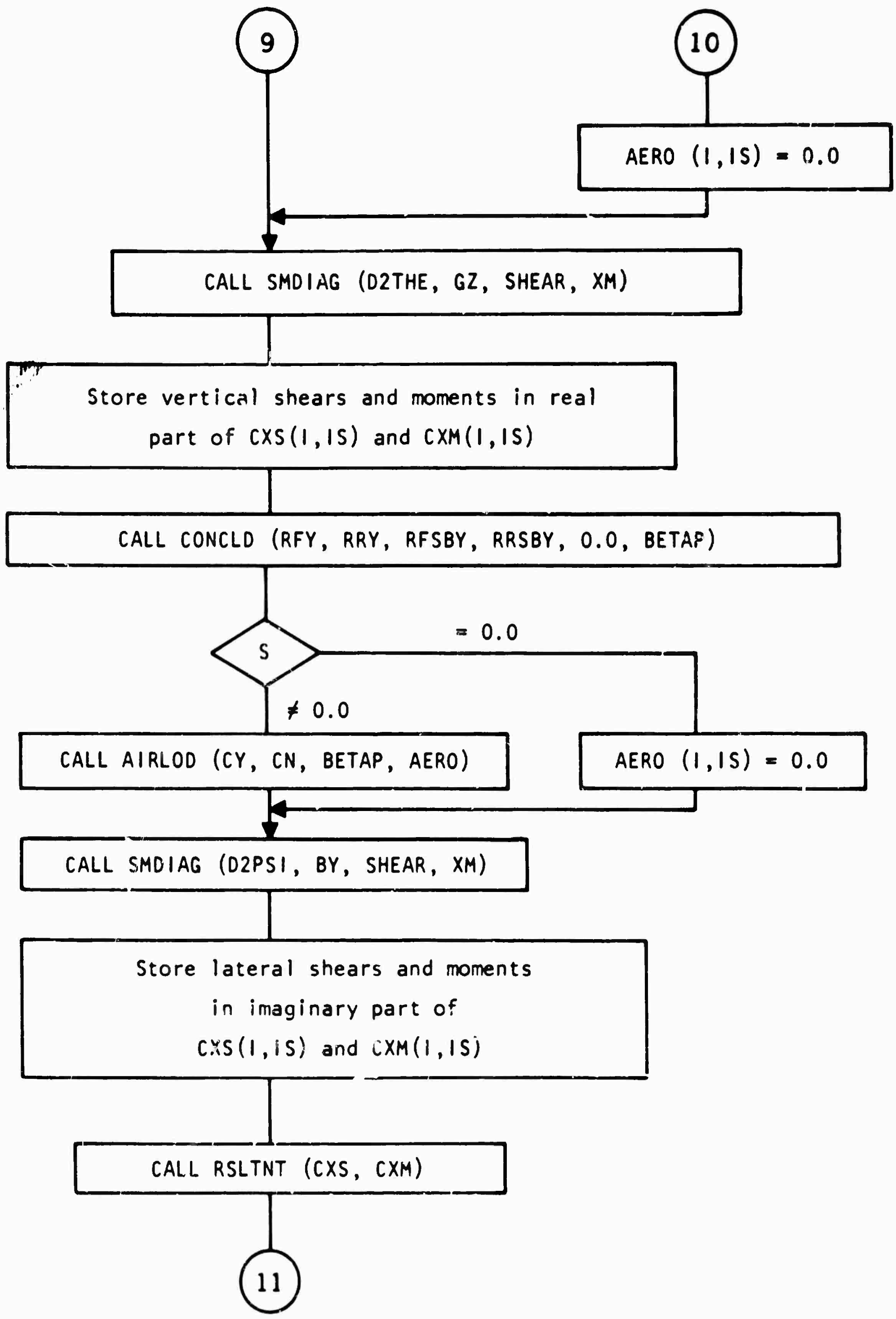
CY = CYB * BETAP

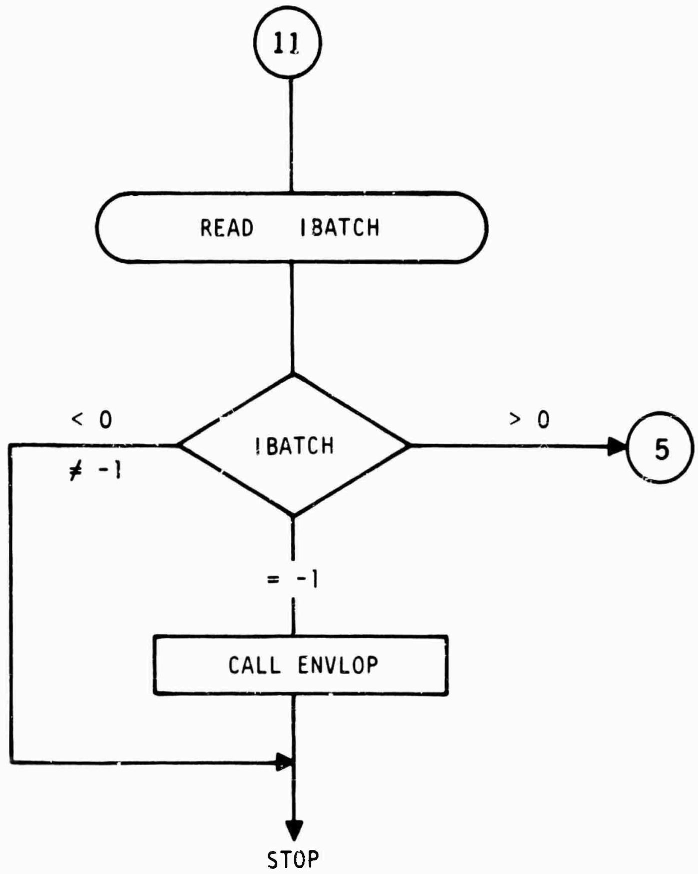
CN = CNB * BETAP

7



7
CALL HANGER (RFZ, RFY, RRZ, RRY, HM, RFSBZ, RFSBY, RRSBZ, RRSBY)
S
= 0.0
8
≠ 0.0
Input RALPHA
NOPT(I,IS)
0
Input all DELCP(I,IS) within an IS Segment
Input DELCP(1,IS) and DELCP(N(IS) + 1,IS), which are values of DELCP at segment end points A(IS) and B(IS)
Fill in the DELCP between end points by linear interpolation
8
CALL CONCLD (RFZ, RRZ, RFSBZ, RRSBZ, HM, ALPHAP)
S
= 0.0
10
≠ 0.0
CALL AIRLOD (CL, CM, ALPHAP, AERO)
9


9
10
AERO (I,IS) = 0.0
CALL SMDIAG (D2THE, GZ, SHEAR, XM)
Store vertical shears and moments in real part of CXS(I,IS) and CXM(I,IS)
CALL CONCLD (RFY, RRY, RFSBY, RRSBY, 0.0, BETAP)
S
= 0.0
≠ 0.0
CALL AIRLOD (CY, CN, BETAP, AERO)
AERO (I,IS) = 0.0
CALL SMDIAG (D2PSI, BY, SHEAR, XM)
Store lateral shears and moments in imaginary part of CXS(I,IS) and CXM(I,IS)
CALL RSLTNT (CXS, CXM)
11



LISTING OF MAIN

A FORTRAN IV or V listing of MAIN is given. Discussion of input data and output results will be deferred to the Appendix.

```
C     MAIN CONTROL PROGRAM TO GENERATE SHRIKE LOAD DISTRIBUTIONS
      COMPLEX CXS, CXM
      DIMENSION CXS(41,25),CXM(41,25)
      DIMENSION XSMAX(41,25),XMMAX(41,25)
      DIMENSION A(25),B(25),N(25),NOPT(25),H(25),X(41,25),W(41,25)
     1,XISECT(41,25),D(41,25),DELCP(41,25),CONCAF(25),CONCAM(25)
     2,AERO(41,25),CONCHL(25),CONCHM(25),SHEAR(41,25),XM(41,25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      COMMON WT,CORRI,D2THE,D2PSI,GX,GY,GZ,HFH,HCC,HRE,BHANGR,CBAR
     1,S,RHO,V,CL,CM,CY,CN,CD,ARC,Q,ISEGS,A,B,N,NOPT,CONCAF,CONCAM
     2,X,DELCP,D,CONCHL,CONCHM,W,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,CANT,BETAF,BETAA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      COMMON XL,XR,DX,DY,NRT,MRT,ILABL,JLABL,NX,NY,MRKPT,LIN,
     1 LINX1,LINX2,LINY1,LINY2,IXL,IXR,IYB,IYT
```

```
            COMMON XSMAX,XMMAX
            COMMON CXS,CXM
          1 FORMAT (6E12.8)
          2 FORMAT (12I6)
          3 FORMAT (2E12.8,2I6)
          4 FORMAT (6E12.5)
          6 FORMAT (61H  SEG  STATION           WEIGHT            SECTION INER
           1TIA    )
          7 FORMAT (1H ,I6,3E18.8)
          8 FORMAT (3E12.8,6I6)
            CALL MAXFRM (500)
            WRITE (6,6)
            READ (5,8) XL,XR,DX,NRT,ILABL,NX,MRKPT,LIN
            NY = 2
            READ (5,2) ISEGS
            READ (5,3) (A(IS), B(IS),N(IS),NOPT(IS), IS = 1, ISEGS)
      C     COMPUTE X STATIONS AND INTEGRATION INTERVAL
            X(1,1) = A(1)
            DO  100  IS = 1, ISEGS
            FN = FLOAT (N(IS))
            H(IS) = (B(IS) - A(IS))/FN
            NIS = N(IS)
            IF (ISEGS .GT. 25) GO TO 120
            IF (NIS .GT. 41) GO TO 120
            DO 101  I = 2, NIS
        101 X(I,IS) = X(I-1,IS) + H(IS)
            X(NIS+1,IS) = B(IS)
        100 X(1,IS+1) = B(IS)
            READ (5,1) WT, XCG, CORRI
            READ (5,1) S, CBAR,ARC
      C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
      C      OPTION TO NEGLECT AERODYNAMIC FORCES
      C      IF S IS READ IN AS ZERO, ALL OTHER AERODYNAMIC-RELATED INPUT
      C      DATA IS OMITTED
      C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
            IF (S .NE. 0.0) GO TO 128
            RHO = 0.0
            V = 0.0
            ISFIN = 0
            ISWING = 0
            CD = 0.0
            CL = 0.0
            CM = 0.0
            CY = 0.0
            CN = 0.0
            ALPHA = 0.0
            BETA = 0.0
            ALPHAP = 0.0
            BETAP = 0.0
            WNGCLA(1) = 0.0
            WNGCMA(1) = 0.0
            FINCLA(1) = 0.0
            FINCMA(1) = 0.0
            WNGCLA(2) = 0.0
            WNGCMA(2) = 0.0
            FINCLA(2) = 0.0
            FINCMA(2) = 0.0
```

```
            RALPHA = 0.0
      128 CONTINUE
            DO 102  IS = 1, ISEGS
            NISP1 = N(IS) + 1
      102 READ (5,4) (W(I,IS), I = 1, NISP1)
            DO 103  IS = 1, ISEGS
            NISP1 = N(IS) + 1
      103 READ (5,4) (XISECT(I,IS), I = 1, NISP1)
            DO 104  IS = 1, ISEGS
            NISP1 = N(IS) + 1
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
            IF (S .EQ. 0.0) GO TO 107
      C     OPTION TO READ OR INTERPOLATE DIAMETER DISTRIBUTION
            IF (NOPT(IS)) 105, 105, 106
      105 READ (5,1) (D(I,IS), I = 1, NISP1)
            GO TO 107
      106 READ (5,1) D(1,IS), D(NISP1,IS)
            AIS = A(IS)
            BIS = B(IS)
            DA = D(1,IS)
            DB = D(NISP1,IS)
            NIS = N(IS)
            DO 108  I = 2, NIS
            XX = X(I,IS)
            CALL ALLPTS(XX,DI,AIS,DA,BIS,DB)
      108 D(I,IS) = DI
      107 CONTINUE
            DO 9000  I = 1, NISP1
     9000 WRITE (6,7) IS,X(I,IS),W(I,IS),XISECT(I,IS)
      104 CONTINUE
            READ (5,1) FHSTA,RHSTA,FSBSTA,RSBSTA
            READ (5,1) HFH, HRE, HDC, RAD, BHANGR
            READ (5,1) BETAF,BETAA,CANT
            READ (5,2) ISFHGR,ISRHGR,ISFSB,ISRSB     ,ISDTNT
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
            IF (S .EQ. 0.0) GO TO 122
            READ (5,2) ISFIN,ISWING
      122 CONTINUE
            READ (5,2) IBATCH
      119 CONTINUE
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
            IF (S .EQ. 0.0) GO TO 123
            READ (5,1) RHO, V
      123 CONTINUE
            READ (5,1) D2THE, D2PSI, GX, GY, GZ
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
            IF (S .EQ. 0.0) GO TO 124
            READ (5,1) CD,CLA,CMA,CYB,CNB
            READ (5,1) ALPHA,BETA
            READ (5,1) WNGCLA(1),WNGCMA(1),FINCLA(1),FINCMA(1)
            READ (5,1) WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
            ALPHAP = ALPHA*COS(0.0174533*CANT) + BETA*SIN(0.0174533*CANT)
            BETAP = BETA*COS(0.0174533*CANT)-ALPHA*SIN(0.0174533*CANT)
            CL = CLA * ALPHAP
            CM = CMA * ALPHAP
            CY = CYB * BETAP
            CN = CNB * BETAP
      124 CONTINUE
```

```
                CALL HANGER(RFZ,RFY,RRZ,RRY,HM,RFSBZ,RFSBY,RRSBZ,RRSBY)
*DIAGNOSTIC*    THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
                IF (S .EQ. 0.0) GO TO 125
                READ (5,1) RALPHA
                DO 111  IS = 1, ISEGS
                NISP1 = N(IS) + 1
          C     INPUT DELTA C.P.
                IF(NOPT(IS)) 109,109,110
            109 READ (5,1) (DELCP(I,IS), I = 1, NISP1)
                GO TO 112
            110 READ (5,1) DELCP(1,IS), DELCP(NISP1,IS)
                AIS = A(IS)
                BIS = B(IS)
                DCPA = DELCP(1,IS)
                DCPB = DELCP(NISP1,IS)
                NIS = N(IS)
                DO 113  I = 2, NIS
                XX = X(I,IS)
                CALL ALLPTS (XX,DCPI,AIS,DCPA,BIS,DCPB)
            113 DELCP(I,IS) = DCPI
            112 CONTINUE
            111 CONTINUE
            125 CONTINUE
                IPLANE = 1
                CALL CONCLD (RFZ,RRZ,RFSBZ,RRSBZ,HM,ALPHAP)
*DIAGNOSTIC*    THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
                IF (S .EQ. 0.0) GO TO 126
                CALL AIRLOD (CL,CM,ALPHAP,AERO)
                GO TO 131
            126 CONTINUE
                DO 129  IS = 1,ISEGS
                NISP1 = N(IS) + 1
                DO 129  I = 1,NISP1
                AERO(I,IS) = 0.0
            129 CONTINUE
            131 CONTINUE
                CALL SMDIAG (D2THE,GZ,SHEAR,XM)
                DO 117  IS = 1, ISEGS
                NISP1 = N(IS) + 1
                DO  117  I =  1,NISP1
                CXS(I,IS) = CMPLX(SHEAR(I,IS), 0.0)
            117 CXM(I,IS) = CMPLX(XM(I,IS), 0.0)
          C     IMAGINARY PART IS SIDE COMPONENT, (+ STARBOARD)
          C     REAL PART IS VERTICAL COMPONENT, (+ UPWARDS)
          C     IF EVER THE DIRECTION OF THE RESULTANT IS NEEDED.
          C     REFERENCE IS THEN POSITIVE CCW LOOKING AFT
                IPLANE = 2
                CALL CONCLD (RFY,RRY,RFSBY,RRSBY,0.0,BETAP)
*DIAGNOSTIC*    THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
                IF (S .EQ. 0.0) GO TO 127
                CALL AIRLOD (CY,CN,BETAP,AERO)
                GO TO 132
            127 CONTINUE
                DO 130  IS = 1,ISEGS
                NISP1 = N(IS) + 1
                DO 130  I = 1,NISP1
                AERO(I,IS) = 0.0
            130 CONTINUE
```

```
      132 CONTINUE
          CALL SMDIAG (D2PSI,GY,SHEAR,XM)
          DO 118  IS = 1, ISEGS
          NISP1 = N(IS) + 1
          DO 118  I = 1,NISP1
          CXS(I,IS) = CMPLX(REAL(CXS(I,IS)), SHEAR(I,IS))
      118 CXM(I,IS) = CMPLX(REAL(CXM(I,IS)),XM(I,IS))
          CALL RSLTNT (CXS, CXM)
          READ (5,2) IBATCH
          IF (IBATCH) 120,120,119
      120 CONTINUE
          IF (IBATCH .EQ. -1) CALL ENVLOP
          STOP
          END

 END OF UNIVAC 1108 FORTRAN V COMPILATION. 8 *DIAGNOSTIC* MESSAGE(S)
.IN             SYMBOLIC                                    18 SEP 67  10:04:16   0  0:
.IN     CODE    RELOCATABLE                                 18 SEP 67  10:04:16   1  01
                                                                                  0  01
```

INPUT DATA

Input data order and field formats are tabulated below. Units must be in pounds and inches due to gravity-acceleration conversions in both versions of HANGER.

Data Card Arrangement and Format

Variable order	Format
XL, XR, DX, NRT, ILABL, NX, MRKPT, LIN Plot grid specifications.[a]	3E12.8,6I6
ISEGS	I6
A(IS), B(IS), N(IS), NOPT(IS) Similar cards are read consecutively for each IS index, $1 \leq IS \leq ISEGS$.	
WT, XCG, CORRI	6E12.8
S, CBAR, ARC	6E12.8
W(I,IS) These distributed running weights are normally the same cards output by WEIGHT.	6E12.5

[a]Plot grid specifications are from NWC's Stromberg-Carlson 4020 plotter and associated subroutines. NWC users should consult SC 4020 manuals and note how these variables are used in the listing. The user at other installations will probably need to modify these segments of the program to suit his own installation. Reference 3 describes NWC's SC 4020.

Variable order	Format
XISECT (I,IS) These section inertias are normally the same cards output by WEIGHT.	6E12.5
D(I,IS) This and the following input are enclosed within an IS-indexed loop. If NOPT (IS) ≤ 0, all D's of the current IS segment are input consecutively.	6E12.8
D(1,IS), D(NISP1,IS) Input if NOPT (IS) > 0; an option to have diameters between segment ends filled in by linear interpolations.	6E12.8
FHSTA, RHSTA, FSBSTA, RSBSTA	6E12.8
HFH, HRE, HDC, RAD, BHANGR	6E12.8
BETAF, BETAA, CANT	6E12.8
ISFHGR, ISRHGR, ISFSB, ISRSB, ISDINT	12I6
ISFIN, ISWING	12I6
IBATCH All following input data are repeated for each batch run.	12I6
RHO, V	6E12.8
D2THE, D2PSI, GX, GY, GZ	6E12.8
CD, CLA, CMA, CYB, CNB	6E12.8
ALPHA, BETA	6E12.8
WINGCLA (1), WINGCMA (1), FINCLA (1), FINCMA (1)	6E12.8
WINGCLA (2), WINGCMA (2), FINCLA (2), FINCMA (2)	6E12.8
RALPHA	6E12.8
DELCP (I,IS) This and the following input are enclosed within an IS-indexed loop. If NOPT (IS) ≤ 0, all DELCP's of the current IS segment are input consecutively.	6E12.8
DELCP (1,IS), DELCP (NISP1,IS) Input if NOPT (IS) > 0; an option to have ΔC_p's between segment ends filled in by linear interpolation	6E12.8

Variable order	Format
ALERR This variable is read by SUBROUTINE AIRLOD; it is mentioned here to complete the order of input for the program.	E12.8
ALERR This variable is read a second time in succession since AIRLOD is called twice for batch run.	E12.8
IBATCH Another batch run is initiated (if IBATCH > 0) and control reverts back to the point where RHO and V are read, or the job is terminated. Note also that a maximum envelope of shears and moments is produced if IBATCH = -1.	I6

OUTPUT DATA

The sole output of MAIN is printout of running weight, section inertias, their stations, and IS segment indices. Other more significant output is done by subroutines to be discussed later.

SUBROUTINE HANGER/A

HANGER/A is an adaptation of an existing hanger loads computer program described in Ref. 2. Changes to the original program included making it into a subroutine which accepts all input from MAIN through variables in COMMON. The routine produces its own printed output of hanger loads as well as returning data to MAIN for use by other subroutines in producing load distributions.

SUBROUTINE HANGER/A is, in Univac parlance, "flagged" by the addition of "/A." This flagged version was stored on tape along with another version having the same name (HANGER/B). At execution time, a choice between these elements is made by punching the chosen label on the XQT card (see Sec. 3, page 18, and Sec. 3, page 27, of Ref. 4).

ENTRY

Entry to HANGER/A is made through the FORTRAN subroutine call: CALL HANGER (RFZ, RFY, RRZ, RRY, HM, RFSBZ, RFSBY, RRSBZ, RRSBY). The first five arguments represent components of hanger loads returned for use by other program segments. The second four mean nothing to this subroutine--they are needed by HANGER/B and are included in HANGER/A's argument list to make the two subroutines' argument lists equal in length.

SYMBOLS AND UNITS FOR HANGER/A

Algebraic symbol	FORTRAN equivalent	Definition
	B	Width between aft hanger rail hooks--B is in COMMON with BHANGR of MAIN (inches)
$\bar{c}$, $\bar{b}$	CBAR BBAR	Aerodynamic reference lengths (inches)--presently, both of these are taken to be identical
C_D	CD	Aerodynamic drag coefficient
C_L	CL	Aerodynamic lift coefficient
C_m	CM	Aerodynamic pitching moment coefficient
C_n	CN	Aerodynamic yawing moment coefficient
C_Y	CY	Aerodynamic side force coefficient
h_d	HD	Moment arm, distance between store longitudinal axis through center of gravity and point on detent resisting forward motion (inches)
h_f	HF	Moment arm, distance between store longitudinal axis through center of gravity and point on forward hanger where side loads are resisted (inches)
h_r	HR	Height of rear hanger (inches). Moment arm associated with side force on rear hanger and rear detent force (detent against rearward motion). Presently, these distances are taken to be identical although modifications to the program can remove this restriction.

Algebraic symbol	FORTRAN equivalent	Definition
I_θ I_ψ	WIP WIPSI	Gross moments of inertia in pitch and yaw (lb-in^2). The current program presumes that the two are equal, and are sometimes called transverse moment of inertia. WIP is in COMMON with CORKI of MAIN.
L		Aerodynamic lift (lb)
M_r	RMR	Roll moment resisted by rear hanger hooks (lb-in). Here, the rear hanger only is able to react roll moments.
n_x	GX	Longitudinal acceleration (gravity units)
n_y	GY	Lateral acceleration (gravity units)
n'_y	GYP	Lateral acceleration (perpendicular to store plane of symmetry), transformed through rotation due to cant angle (gravity units)
n_z	GZ	Vertical acceleration (gravity units)
n'_z	GZP	Vertical acceleration (in store plane of symmetry), transformed through rotation due to cant angle (gravity units)
q	Q	Dynamic pressure (lb/in^2)
R_{f_y}	RFY	Side load on forward hanger (lb)
R_{f_z}	RFZ	Vertical load on forward hanger (lb)
R_{r_y}	RRY	Side load on rear hanger (lb)
R_{r_z}	RRZ	Vertical load on rear hanger (lb)
$R_{r_{z_s}}$ $R_{r_{z_p}}$	RRZS RRZP	Combined load on starboard (RRZS) and port (RRZP) launcher hooks (lb)
R_x	RX	Longitudinal load (lb)
S	S	Aerodynamic reference area, usually body cross-sectional area or wing area (in^2)

Algebraic symbol	FORTRAN equivalent	Definition
V	V	True airspeed (ft/sec)
W	W	Gross weight of store (lb). W is in COMMON with WT of MAIN
x_a	ARC	Aerodynamic reference center point about which aerodynamic moments and forces are given (inches)
x_{cg}	XCG	Center of gravity station (inches)
x_{La}	CLARC	Longitudinal distance between aerodynamic reference center and center of gravity (inches)
x_{LF}	XLF	Longitudinal distance between forward hanger and center of gravity (inches)
x_{LR}	XLR	Longitudinal distance between rear hanger and center of gravity (inches)
Y		Aerodynamic side force (lb)
	FHSTA	Forward hanger station (inches)
	HM	Bending moment on store due to longitudinal load on detent (lb-in)
	RHSTA	Rear hanger station (inches)
γ	GAM	Cant angle (deg)--GAM is in COMMON with CANT of MAIN
$\ddot{\theta}$	D2THE	Pitch angular acceleration (rad/sec^2)
$\ddot{\theta}'$	D2THEP	Pitch acceleration, transformed through rotation due to cant angle (rad/sec^2)
ρ	RHO	Atmospheric density (slug/ft^3)
$\ddot{\psi}$	D2PSI	Yaw angular acceleration (rad/sec^2)
$\ddot{\psi}'$	D2PSIP	Yaw acceleration, transformed through rotation due to cant angle (rad/sec^2)

EQUATIONS

Figure 3 is a sketch showing positive forces and moment arms involved in the operations performed by HANGER/A. These operations will be discussed in their sequence of appearance in the computer program.

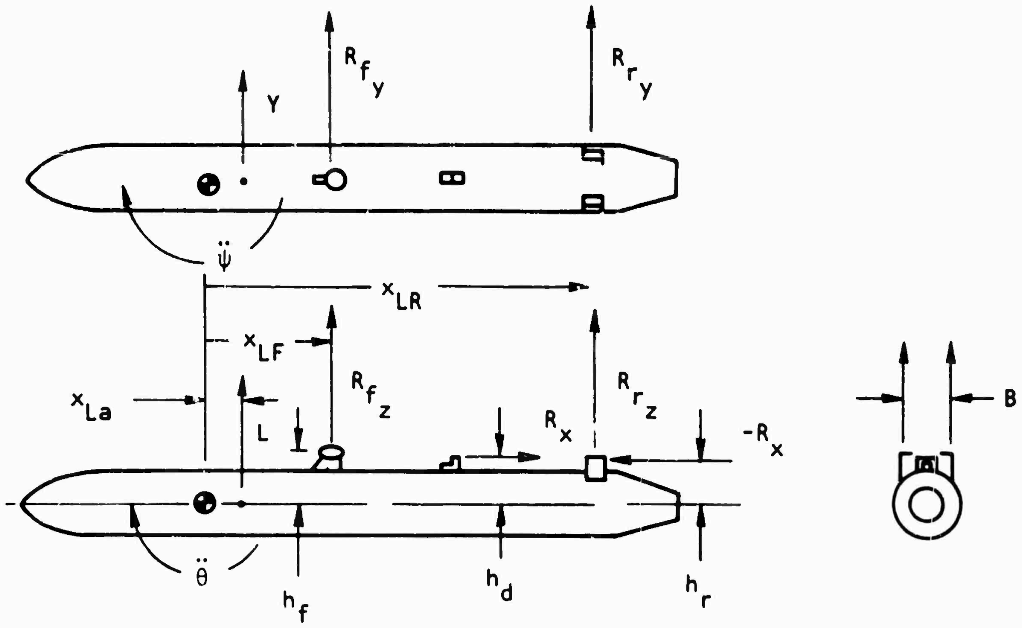


FIG. 3.

Initially, the longitudinal moment arms are computed from input hanger stations

$$XLARC = XCG - ARC$$

$$XLR = RHSTA - XCG$$

$$XLF = FHSTA - XCG$$

using the center of gravity as a reference. Allowance was made for the possibility of being given aerodynamic forces and moments at a point other than the store's center of gravity.

Load conditions are usually given relative to airplane referenced axes, whereas the store may be carried on a canted station. For such situations, it is convenient to transform loads to a store-referenced system by means of a rotation through cant angle (Fig. 4).

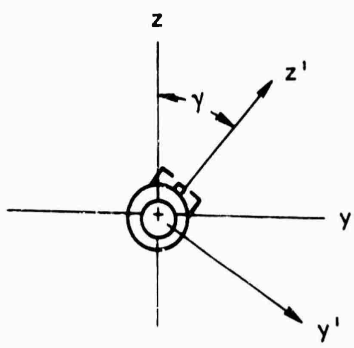


FIG. 4.

$$n'_z = n_z \cos + n_y \sin$$

$$n'_y = n_y \cos - n_z \sin$$

$$\ddot{\theta}' = \ddot{\theta} \cos + \ddot{\psi} \sin$$

$$\ddot{\psi}' = \ddot{\psi} \cos - \ddot{\theta} \sin$$

Similar transformations are made for aerodynamic loads in MAIN. Evidence can be found in the FORTRAN coding that these transformations were an admitted afterthought--however, they do work.

A reference aerodynamic force is computed as

$$qS = \frac{\rho\ v^2}{2}\ S/144$$

in pounds force. This reference force, when multiplied by an appropriate coefficient, is combined with inertial effects

$$R_x = -W \cdot n_x - C_D \cdot qS$$

The hanger configuration for which this program was originally designed (Shrike) was restrained against rearward motion by stopping against the rear hanger, and against forward motion by a detent. A moment (FORTRAN HM) in the x-z plane due to longitudinal forces (R_x) is computed for external argument return and for use within this program segment. If R_x is negative--as when drag loads and positive longitudinal accelerations are imposed--then R_x is imposed on the rear hanger and

$$HM = R_x \cdot hr$$

If R_x is positive--as when the carrying aircraft is decelerated--then the detent bears the load of R_x and

$$HM = R_x \cdot h_d$$

Equations producing hanger loads follow closely derivations found in Ref. 2. Basically they are moment summations about either the forward or aft hanger. Moments in the store x-z plane summed about the aft hanger give the vertical load on the forward hanger[2]

$$R_{f_z} = \left[-HM + x_{LR} \cdot W \cdot n_z + \frac{I_\theta \cdot \ddot{\theta}}{386.088} - C_L \cdot Sq \cdot \left(x_{LR} - x_{La}\right) - C_M \cdot \bar{c} \cdot Sq\right] / \left(x_{LR} - x_{LF}\right)$$

Moments in the store x-y plane summed about the aft hanger are quite similar (although R_x does not enter). These give side loads on the rear hanger as follows:

$$R_{f_y} = \left[\frac{\ddot{\psi} \cdot I_\psi}{386.088} + x_{LR} \cdot W \cdot n_y - C_Y \cdot Sq \cdot \left(x_{LR} - x_{La}\right) - C_n \cdot \bar{b} \cdot Sq\right] / \left(x_{LR} - x_{LF}\right)$$

[2]The gravity constant, 386.088 in/sec^2, reconciles the use of lb-in^2 units for moment of inertia with angular accelerations in rad/sec^2.

In like manner, taking moments about the forward hanger,

$$R_{rz} = \left[HM - x_{LF} - W \cdot n_z - \frac{\ddot{\theta} \cdot I_\theta}{386.088} + C_L \cdot Sq \cdot \left(x_{LF} - x_{La}\right) + C_m \cdot \bar{c} \cdot Sq\right] / \left(x_{LR} - x_{LF}\right)$$

$$R_{ry} = \left[-x_{LF} \cdot W \cdot n_y - \frac{\ddot{\psi} \cdot I_\psi}{386.088} + C_Y \cdot Sq \cdot \left(x_{LF} - x_{La}\right) + C_n \cdot \bar{b} \cdot Sq\right] / \left(x_{LR} - x_{LF}\right)$$

The foregoing vertical and lateral hanger loads, as well as the concentrated hanger moment, HM, are returned to MAIN for inclusion into shear and moment diagrams. However, the load on the rear hanger can be described further. Asymmetries about the x-y plane produce roll moments due to lateral loads, and the rear hanger alone must resist these roll moments. A simple approach to accounting for roll moment is to think of that moment as maintaining equilibrium with the already derived transverse hanger loads.

$$M_R = R_{f_y} \cdot h_f + R_{r_y} \cdot h_r$$

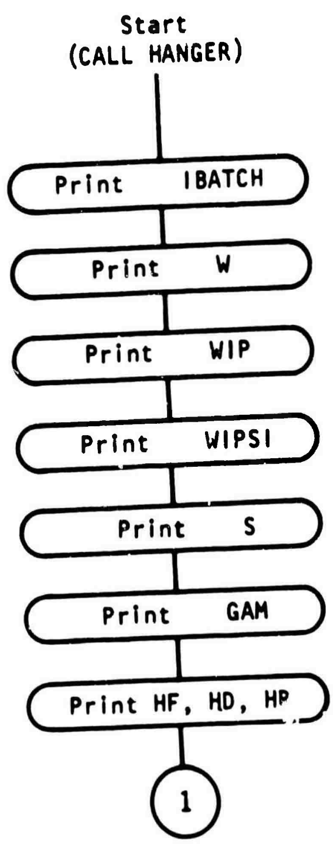
Assuming that a roll moment is reacted by differential vertical loads on either rear hanger hook,

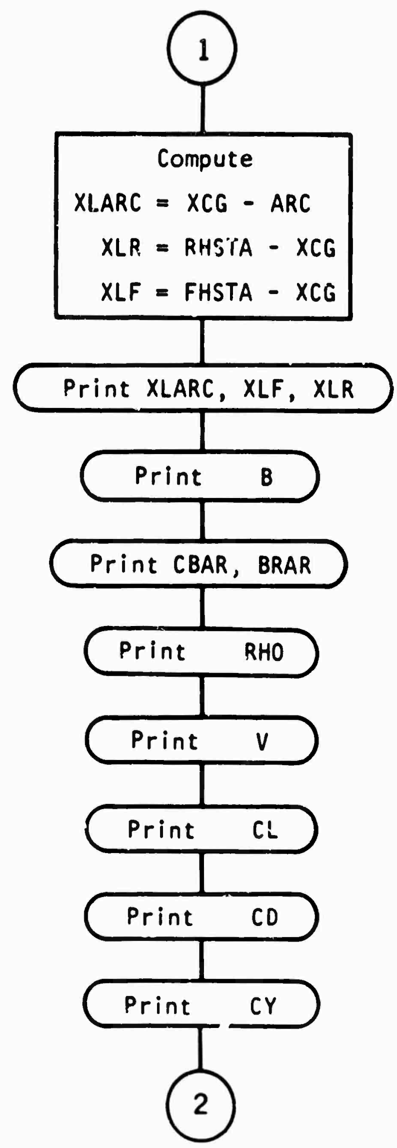
$$R_{r_{z_P}} = \frac{R_{r_z}}{2} + \frac{M_r}{B}$$

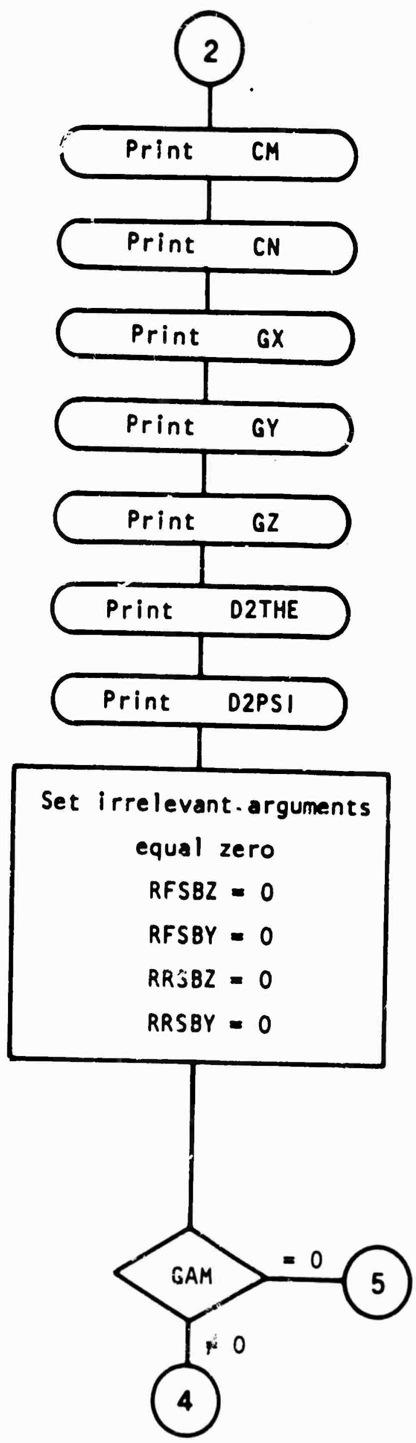
$$R_{r_{z_S}} = \frac{R_{r_z}}{2} - \frac{M_r}{B}$$

gives individual loads on the port and starboard hook, respectively.

FLOW CHART


Start
(CALL HANGER)
Print IBATCH
Print W
Print WIP
Print WIPSI
Print S
Print GAM
Print HF, HD, HP
1


1
Compute
XLARC = XCG - ARC
XLR = RHSTA - XCG
XLF = FHSTA - XCG
Print XLARC, XLF, XLR
Print B
Print CBAR, BRAR
Print RHO
Print V
Print CL
Print CD
Print CY
2


2
Print CM
Print CN
Print GX
Print GY
Print GZ
Print D2THE
Print D2PSI
Set irrelevant arguments
equal zero
RFSBZ = 0
RFSBY = 0
RRSBZ = 0
RRSBY = 0
GAM
= 0
5
≠ 0
4

4

Axis transformation (rotation through cant angle)

GZP = GZ * COS (0.0174533 * GAM) + GY * SIN (0.0174533 * GAM)

GYP = GY * COS (0.0174533 * GAM) - GZ * SIN (0.0174533 * GAM)

D2THEP = D2THE * COS (0.0174533 * GAM) + D2PSI * SIN (0.0174533 * GAM)

D2PSIP = D2PSI * COS (0.0174533 * GAM) - D2THE * SIN (0.0174533 * GAM)

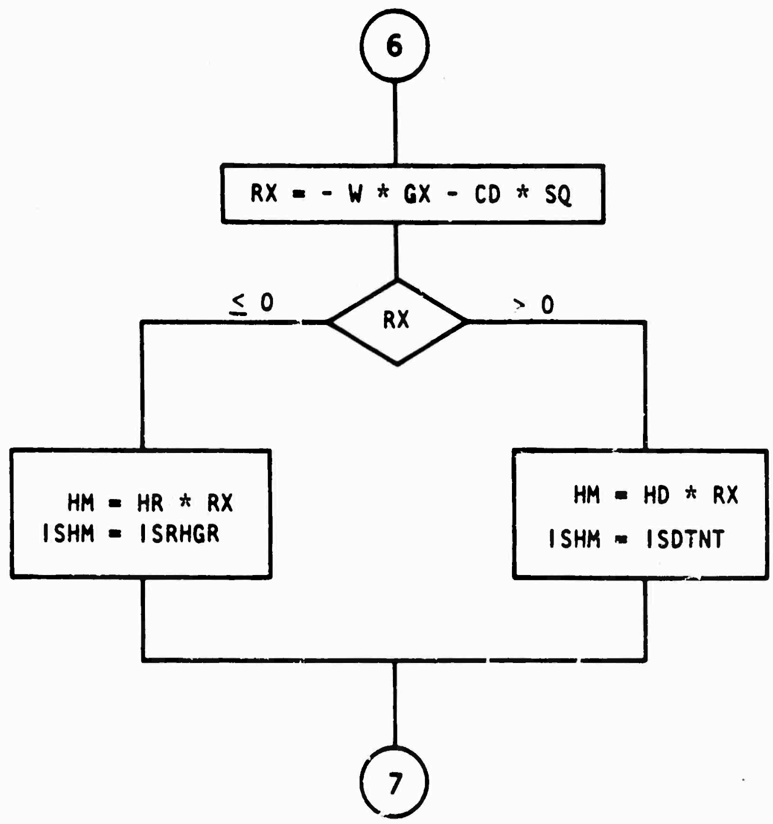
Store primed acceleration
into unprimed locations
(An expedient to avoid changes
in coding of a program
previously designed to handle
uncanted stores)

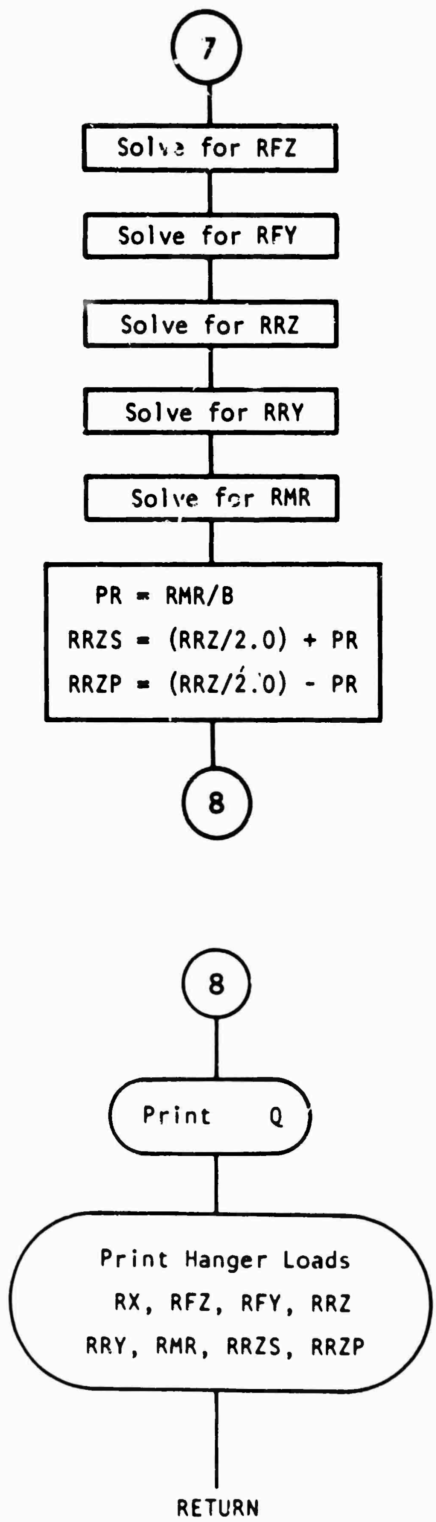
5

$Q = \frac{1}{2}$ * RHO * (V ** 2)/144.0

SQ = S * Q

6


6
RX = - W * GX - CD * SQ
≤ 0
RX
> 0
HM = HR * RX
ISHM = ISRHGR
HM = HD * RX
ISHM = ISDTNT
7


7
Solve for RFZ
Solve for RFY
Solve for RRZ
Solve for RRY
Solve for RMR
PR = RMR/B
RRZS = (RRZ/2.0) + PR
RRZP = (RRZ/2.0) - PR
8
8
Print Q
Print Hanger Loads
RX, RFZ, RFY, RRZ
RRY, RMR, RRZS, RRZP
RETURN

LISTING OF HANGER/A

A FORTRAN IV or V listing of HANGER/A follows. Discussion of input data and output results will be deferred to the Appendix.

```
      SUBROUTINE HANGER(RFZ,RFY,RRZ,RRY,HM,RFSBZ,RFSBY,RRSBZ,RRSBY)
C     ROUTINE TO SOLVE FOR SHRIKE II HANGER LOADS
C     SHRIKE HANGER LOADS PROGRAM
C     LOVIC THOMAS   4062
      DIMENSION A(25),Z12(25),N(25),NOPT(25),Z13(25),Z14(25),X(41,25)
     1,DELCP(41,25),D(41,25),Z15(25),Z16(25),Z17(41,25),AERO(41,25)
     2,XISECT(41,25),H(25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      COMMON W,WIP, D2THE,D2PSI,GX,GY,GZ,HF,HD,HR,B,CBAR,S,RHO,V,CL,CM
     1,CY,CN,CD,ARC,Q,ISEGS,A,Z12,N,NOPT,Z13,Z14,X,DELCP,D,Z15,Z16,Z17
     2,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      EQUIVALENCE (BBAR,CBAR)
    1 FORMAT (1H1)
    2 FORMAT (52H HANGER LOADS ON MISSILE-UP AND STARB'D ARE POSITIVE)
    3 FORMAT (//24H MISSILE CHARACTERISTICS)
    4 FORMAT (/10H WEIGHT = ,E12.5,4H LBS)
    5 FORMAT (17H PITCH INERTIA = ,E12.5,9H LB*IN**2)
    6 FORMAT (15H YAW INERTIA = ,E12.5,9H LB*IN**2)
    7 FORMAT (18H REFERENCE AREA = ,E12.5,7H SQ.IN.)
    8 FORMAT (//26H HANGER DIMENSIONS, INCHES)
    9 FORMAT (26H HF          HD          HR)
   10 FORMAT (E12.5,E12.5,E12.5)
   11 FORMAT (/20H MOMENT ARMS, INCHES)
   12 FORMAT (28H L AERO CTR   LF          LR)
   13 FORMAT (E12.5,E12.5,E12.5)
   14 FORMAT (/26H REFERENCE LENGTHS, INCHES)
   15 FORMAT ( 6H CBAR=,E12.5,6H BBAR=,E12.5)
  100 FORMAT (18H HANGER WIDTH B = ,E12.5,7H INCHES)
   16 FORMAT (/7H RHO = ,E12.5,12H SLUGS/CU FT)
   17 FORMAT ( 5H V = ,E12.5,12H FT/SEC  TAS)
   18 FORMAT (13H LIFT COEF = ,E12.5)
   19 FORMAT (/17H AERODYNAMIC DATA)
   20 FORMAT (13H DRAG COEF = ,E12.5)
   21 FORMAT (19H SIDE FORCE COEF = ,E12.5)
   22 FORMAT (21H PITCH MOMENT COEF = ,E12.5)
   23 FORMAT (19H YAW MOMENT COEF = ,E12.5)
   24 FORMAT (/13H LOAD FACTORS)
   25 FORMAT (6H GX = ,E12.5)
   26 FORMAT (6H GY = ,E12.5)
   27 FORMAT (6H GZ = ,E12.5)
   28 FORMAT (/22H ANGULAR ACCELERATIONS)
   29 FORMAT (23H RADIANS PER SQUARE SEC)
   30 FORMAT (20H THETA DOUBLE DOT = ,E12.5)
   31 FORMAT (18H PSI DOUBLE DOT = ,E12.5)
   32 FORMAT (//20H DYNAMIC PRESSURE = ,E12.5)
   33 FORMAT (////13H HANGER LOADS)
   44 FORMAT (/14H CANT ANGLE = ,E12.5,8H DEGREES)
   34 FORMAT (/ 7H RX  = ,E12.5,4H LBS)
   35 FORMAT ( 7H RFZ = ,E12.5,4H LBS)
   36 FORMAT ( 7H RFY = ,E12.5,4H LBS)
```

```
      37 FORMAT ( 7H RRZ = ,E12.5,4H LBS)
      38 FORMAT ( 7H RRY = ,E12.5,4H LBS)
      39 FORMAT ( 7H MR  = ,E12.5,6H LB-IN)
      40 FORMAT ( 7H RRZS= ,E12.5,4H LBS)
      41 FORMAT ( 7H RRZP= ,E12.5,4H LBS)
      42 FORMAT (////////)
      43 FORMAT (5H CASE,I6)
         WIPSI = WIP
         WRITE (6,1)
         WRITE (6,2)
         WRITE (6,43) IBATCH
         WRITE (6,3)
         WRITE (6,4) W
         WRITE (6,5) WIP
         WRITE (6,6) WIPSI
         WRITE (6,7) S
         WRITE (6,44) GAM
         WRITE (6,8)
         WRITE (6,9)
         WRITE (6,10)  HF, HD, HR
         WRITE (6,11)
         WRITE (6,12)
         XLARC = XCG - ARC
         XLR = RHSTA - XCG
         XLF = FHSTA - XCG
         WRITE (6,13) XLARC, XLF, XLR
         WRITE (6,100) B
         WRITE (6,14)
         WRITE (6,15)  CBAR, BBAR
         WRITE (6,19)
         WRITE (6,16) RHO
         WRITE (6,17)  V
         WRITE (6,18) CL
         WRITE (6,20) CD
         WRITE (6,21) CY
         WRITE (6,22) CM
         WRITE (6,23) CN
         WRITE (6,24)
         WRITE (6,25) GX
         WRITE (6,26) GY
         WRITE (6,27) GZ
         WRITE (6,28)
         WRITE (6,29)
         WRITE (6,30) D2THE
         WRITE (6,31) D2PSI
         RFSBZ = 0.0
         RFSBY = 0.0
         RRSBZ = 0.0
         RRSBY = 0.0
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
         IF (GAM .EQ. 0.0) GO TO 301
         GZP = GZ*COS(0.0174533*GAM) + GY*SIN(0.0174533*GAM)
         GYP = GY*COS(0.0174533*GAM) - GZ*SIN(0.0174533*GAM)
         D2THEP = D2THE*COS(0.0174533*GAM) + D2PSI*SIN(0.0174533*GAM)
         D2PSIP = D2PSI*COS(0.0174533*GAM) - D2THE*SIN(0.0174533*GAM)
         D2THE = D2THEP
         D2PSI = D2PSIP
         GZ = GZP
         GY = GYP
     301 Q = 0.5*RHO*(V**2)/144.0
```

```
      SQ = S * Q
C     DRAG LOAD ON DETENT
      RX = - W * GX - CD * SQ
      IF (RX)  121,121,123
  121 HM = HR * RX
      ISHM = ISRHGR
      GO TO 122
  123 HM = HD * RX
      ISHM = ISDTNT
  122 CONTINUE
C     VERTICAL LOAD ON FORWARD HANGER
      RFZ = -HM + XLR*W*GZ + WIP*D2THE/386.088
      RFZ=RFZ-CL*SQ*(XLR-XLARC)-CM*CBAR*SQ
      RFZ = RFZ /(XLR - XLF)
C     SIDE LOAD ON FORWARD HANGER
      RFY = D2PSI*WIPSI/386.088+XLR*W*GY-CY*SQ*(XLR-XLARC)
      RFY=RFY - CN* BBAR * SQ
      RFY = RFY /(XLR - XLF)
C     VERTICAL LOAD ON REAR HANGER, LESS MOMENT
      RRZ = HM - XLF*W*GZ - D2THE*WIP/386.088
      RRZ =RRZ+CL*SQ*(XLF-XLARC)+CM*CBAR*SQ
      RRZ =RRZ /(XLR - XLF)
C     SIDE LOAD ON REAR HANGER
      RRY = -XLF*W*GY-D2PSI*WIPSI/386.088+CY*SQ*(XLF-XLARC)
      RRY=RRY + CN*BBAR*SQ
      RRY = RRY /(XLR - XLF)
C     MOMENT LOAD ON REAR HANGER
      RMR = RFY*HF + RRY*HR
C     TOTAL VERTICAL LOAD ON EACH HALF OF REAR HANGER
      PR = RMR / B
      RRZS = (RRZ/2.0) + PR
      RRZP = (RRZ/2.0) - PR
      WRITE (6,32) Q
      WRITE (6,33)
      WRITE (6,34) RX
      WRITE (6,35) RFZ
      WRITE (6,36) RFY
      WRITE (6,37) RRZ
      WRITE (6,38) RRY
      WRITE (6,39) RMR
      WRITE (6,40) RRZS
      WRITE (6,41) RRZP
      WRITE (6,1)
      RETURN
      END
```

INPUT DATA

HANGER/A has no input of its own. All data it requires is furnished by MAIN through a COMMON specification.

OUTPUT DATA

HANGER/A prints out input data presented to it by MAIN and values of hanger loads computed within itself. Two components of the fore and aft hanger loads, plus a concentrated hanger moment in the store plane of symmetry are returned to MAIN through subroutine arguments. The location of the concentrated moment is returned through COMMON.

Printed Output

1. IBATCH
2. W
3. WIP
4. WIPSI
5. S
6. GAM
7. HF, HD, HR
8. XLARC, XLF, XLR
9. B
10. CBAR, BBAR
11. RHO
12. V
13. CL
14. CD
15. CY
16. CM
17. CN
18. GX
19. GY
20. GZ
21. D2THE
22. D2PSI
23. Q
24. RX
25. RFZ
26. RFY
27. RRZ
28. RRY
29. PMR
30. RRZS
31. RRZP

SUBROUTINE HANGER/B

HANGER/B is an adaptation of an existing two-lug and sway-brace computer program based on suggested procedures of Ref. 1 and further developed from programs used in Ref. 5 and 6. Changes to the original program and suggested procedures included making a subroutine which accepts all input from MAIN through COMMON, altering sign convention to better interface with other subroutines, and improving the efficiency somewhat. The routine produces its own printed output of hanger loads as well as returning data to MAIN for use by other subroutines in producing load distributions.

SUBROUTINE HANGER/B is, in Univac parlance, "flagged" by the addendum "/B." This flagged version was stored on tape along with another version (HANGER/A)--at execution time, a choice between these elements is made by punching the chosen label on the XQT card (see Sec. 3, pages 18 and 27 of Ref. 4).

ENTRY

Entry to HANGER/B is made from MAIN through the FORTRAN subroutine call: CALL HANGER (RFZ, RFY, RRZ, RRY, HM, RFSBZ, RFSBY, RRSBZ, RRSBY).

The first few arguments correspond to the variables RRF, RYF, RZA, RYA within the subroutine itself. These, along with the last five arguments, represent components of hanger loads returned for use by other program segments.

SYMBOLS AND UNITS FOR HANGER/B

Algebraic symbol	FORTRAN equivalent	Definition
β_a	BA	Aft sway brace angle (deg)--BA is in COMMON with BETAA of MAIN
β_f	BF	Forward sway brace angle (deg)--BF is in COMMON with BETAF of MAIN
c	C	Vertical distance between upper surface of store and a line on the crossbar of a lug whose fore and aft load is reacted (inches)--C is in COMMON with HDC of MAIN

Algebraic symbol	FORTRAN equivalent	Definition
$\bar{c}$	CBAR	Reference length, for aerodynamic moment coefficients (inches)
C_D	CD	Aerodynamic drag coefficient
C_L	CL	Aerodynamic lift coefficient
C_m	CM	Aerodynamic pitching moment coefficient
C_n	CN	Aerodynamic yawing moment coefficient
C_Y	CY	Aerodynamic side force coefficient
e	E	Vertical distance between the store center of gravity and the intersection of the lines of action of the sway braces (inches)--E is in COMMON with HRE of MAIN
h	H	Vertical distance between upper surface of the store and the point on the lug where a side load reaction may occur (inches)--H is in COMMON with HFH of MAIN
I_θ I_ψ	WIP WIPSI	Gross moments of inertia in pitch and yaw (lb-in^2). The current program presumes that the two are equal. WIP is in COMMON with CORRI of MAIN
L		Aerodynamic lift (lb)
M_θ M_ψ	PITMT YAWMT	Accumulated gross aerodynamic and inertia moments at the store center of gravity (lb-in). Subscripts θ and ψ denote pitch and yaw moments in a store-oriented axis system
n_x	GX	Longitudinal acceleration (gravity units)
n_y	GY	Lateral acceleration (gravity units)
n'_y	YNP	Lateral acceleration (perpendicular to store plane of symmetry), transformed through rotation due to cant angle (gravity units)
n_z	GZ	Vertical acceleration (gravity units)

Algebraic symbol	FORTRAN equivalent	Definition
n'_z	ZNP	Vertical acceleration (in store plane of symmetry), transformed through rotation due to cant angle (gravity units)
P_x P_y P_z	PX PY PZ	Accumulated gross aerodynamic and inertia forces imposed on the store at its center of gravity (lb). Subscripts x, y, or z denote components in those directions relative to a store-oriented axis system
q	Q	Dynamic pressure (lb/in^2)
r	RAD	Radius of store, or distance from point of contact between sway brace and store to intersection of sway brace lines of action (inches)
R_b		Compression load on an unspecified sway brace (lb). Subscript "a" for an aft brace, subscript "f" for a forward brace
R_x		Longitudinal load on an unspecified lug (lb)
R_{xa}	RXA	Longitudinal load on aft lug (lb)
R_{xf}	RXF	Longitudinal load on forward lug (lb)
R_{ya}	RYA	Side load on aft lug (lb)
R_{yf}	RYF	Side load on forward lug (lb)
R_{za}	RZA	Vertical load on aft lug (lb)
R_{zf}	RZF	Vertical load on forward lug (lb)
S	S	Aerodynamic reference area, usually body cross-sectional area or wing area (in^2)
V	V	True airspeed (ft/sec)
V_{bf} V_{ba}	VBF VBA	Vertical components of sway brace loads due to side loads and moments (lb). V_b, if present at all, always acts downward on the store

Algebraic symbol	FORTRAN equivalent	Definition
W	W	Gross weight of stores (lb)--W is in COMMON with WT of MAIN
x_a	XA	Distance between aft hanger station and center of gravity station (inches)
x_{ba}	XBA	Distance between aft sway brace station and center of gravity station (inches)
x_{bf}	XBF	Distance between forward sway brace station and center of gravity station (inches)
x_{cg}	XCG	Center of gravity station (inches)
x_f	XF	Distance between forward hanger station and center of gravity station (inches)
Y		Aerodynamic side force (lb)
	FHSTA	Forward hanger station (inches)
	FSBSTA	Forward sway brace station (inches)
	HM	Bending moment on store due to longitudinal load on lug (lb-in)
	ISHM	IS segment, the aft end of which is located HM
	RBAMN	The lesser of the aft sway brace loads (lb)
	RBAMX	The greater of the aft sway brace loads (lb)
	RBFMN	The lesser of the forward sway brace loads (lb)
	RBFMX	The greater of the forward sway brace loads (lb)
	RFSBY	Total side load exerted by forward sway braces (lb)
	RFSBZ	Total vertical load exerted by forward sway braces (lb)
	RHSTA	Rear hanger station (inches)
	RSBSTA	Rear sway brace station (inches)

Algebraic symbol	FORTRAN equivalent	Definition
	RRSBY	Total side load exerted by aft sway braces (lb)
	RRSBZ	Total vertical load exerted by aft sway braces (lb)
γ	GAM	Cant angle (deg)--GAM is in COMMON with CANT of MAIN
$\ddot{\theta}$	D2THE	Pitch angular acceleration (rad/sec^2)
$\ddot{\theta}'$	PITNP	Pitch acceleration, transformed through rotation of cant angle (rad/sec^2)
ρ	RHO	Atmospheric density (slug/ft^3)
$\ddot{\psi}$	D2PSI	Yaw angular acceleration (rad/sec^2)
$\ddot{\psi}'$	YAWNP	Yaw acceleration, transformed through rotation of cant angle (rad/sec^2)

EQUATIONS

Following is an outline of the equations used in HANGER/B and their derivation. The tenor set in Ref. 1 is followed, although some variation was made on sign convention to make these equations more harmonious with other subroutines. Perhaps these equations should be regarded as rational rules for apportioning loads among the hanger components so that forces and moments balance rather than as solutions of a statics problem. One who sets out to compare measured loads with results of these equations may be disappointed due to variations of preload on sway braces, elastic effects, etc.

Figure 5 is a sketch showing positive forces and moment arms involved in the operations performed by HANGER/B. Those operations will be discussed in a sequence close to their order of appearance in the computer program.

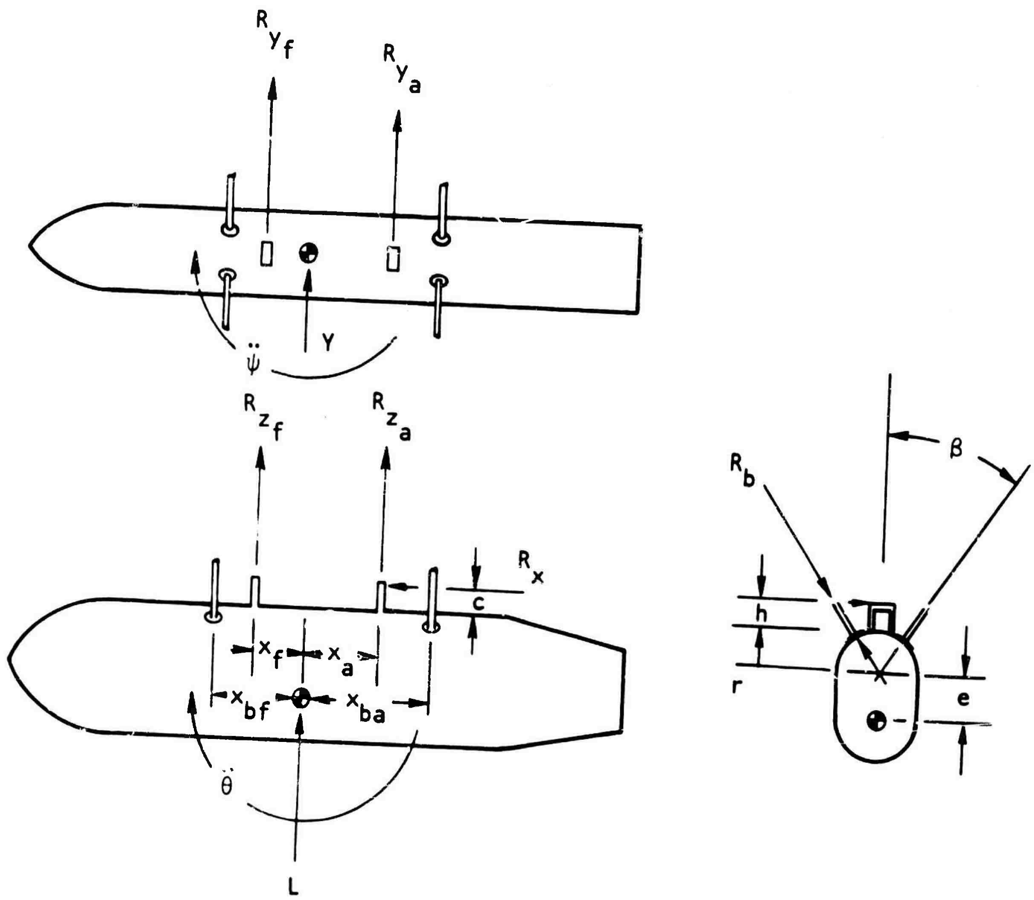


FIG. 5.

Moment arms between the center of gravity and the lugs and sway braces are computed as follows:

$$x_a = RHSTA - x_{cg}$$

$$x_f = x_{cg} - FHSTA$$

$$x_{ba} = RSBSTA - x_{cg}$$

$$x_{bf} = x_{cg} - FSBSTA$$

Note that positive moment arms presume that the center of gravity lies aft of the forward lug and braces, and forward of the aft lug and braces. If circumstances are otherwise for any of the four moment arms, then that arm will become negative.

Dynamic pressure is computed and stored in units of lb/in^2.

$$q = \frac{\rho V^2}{2} S/144$$

Load conditions are usually given relative to aircraft-referenced axes, although the store may be carried on a canted station. Loads on the store are given relative to a store-oriented axis system. The transformation of load conditions to a store-referenced system by means of an axis rotation through cant angle is shown in Fig. 6.

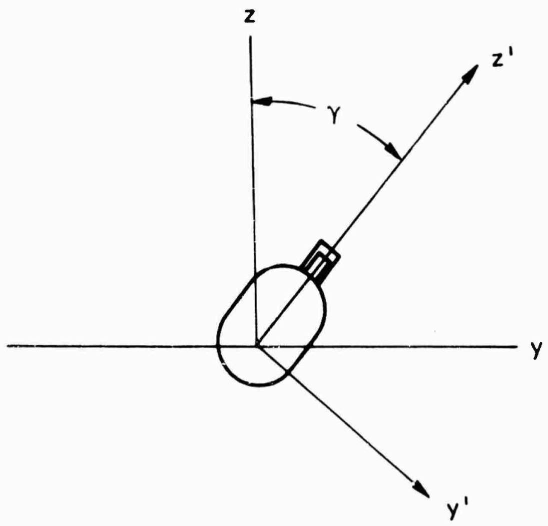


FIG. 6.

$$n_z' = n_z \cos \gamma + n_y \sin \gamma$$

$$n_y' = n_y \cos \gamma - n_z \sin \gamma$$

$$\ddot{\theta}' = \ddot{\theta} \cos \gamma + \ddot{\psi} \sin \gamma$$

$$\ddot{\psi}' = \ddot{\psi} \cos \gamma - \ddot{\theta} \sin \gamma$$

These transformed accelerations are returned to MAIN for use by other subroutines in generating store-referenced loads. Transformations similar to these are made for aerodynamic loads in MAIN. Several changes of variable names associated with these accelerations reflect the fact that the transformations were an afterthought--however, the correct values eventually get stored in the proper memory locations.

Aerodynamic and inertial forces and moments are next accumulated into components along the store-oriented axis system as follows:

$$P_x = n_x \cdot W + C_D \cdot q \cdot s$$

$$P_y = C_Y \cdot q \cdot x - n_y' \cdot W$$

$$P_z = C_L \cdot q \cdot s - n_z' \cdot W$$

$$M_\theta = C_m \cdot q \cdot s \cdot \bar{c} - \ddot{\theta}' \cdot I_\theta/386.088$$

$$M_\psi = C_n \cdot q \cdot s \cdot \bar{c} - \ddot{\psi}' \cdot I_\psi/386.088$$

Following the procedure outlined in Ref. 1, vertical components of sway brace loads due to side loads and yawing moments are accumulated. Some preliminary derivations and related tacit assumptions not shown in Ref. 1 are given here so as to impart to the user an insight of his own concerning the equations programmed into this subroutine. Summing moments on the store about the aft sway brace station,

$$V_{bf}\left(x_{ba} + x_{bf}\right) \tan \beta_f = \pm\left|P_y \cdot x_{ba} + R_{yf}\left(x_f + x_{ba}\right) + R_{ya}\left(x_{ba} - x_a\right) + M_\psi\right| \qquad (1)$$

The above equation assumes that the sway brace takes only compressive load along a line of action perpendicular to the surface of the store at the point of contact between sway brace and store. A similar summation about the forward sway brace station gives

$$V_{ba}\left(x_{ba} + x_{bf}\right) \tan \beta_a = \pm\left|-P_y \cdot x_{bf} - R_{yf}\left(x_{bf} - x_f\right) - R_{ya}\left(x_{bf} + x_a\right) + M_\psi\right| \qquad (2)$$

At this point, something must be said about side loads on the lugs. Summing roll moments about the intersection of the sway brace lines of action,

$$P_y \cdot e = R_{yf}\,(r + h) + R_{ya}\,(r + h) \qquad (3)$$

We now have four unknown hanger loads and only three equations. If we appeal to "judgment" and prorate side load on the lugs in inverse proportion to their center of gravity distances, we have a much-needed fourth equation. In the presence of the sway braces, there appears to be no reason why such an apportionment should necessarily hold, but a fourth equation is needed and the author would rather not go into elastic considerations--besides, it appears that Ref. 1 follows this very reasoning.

$$R_{yf}/R_{ya} = x_a/x_f \tag{4}$$

Substituting Eq. 3 and 4 into Eq. 1 and 2,

$$V_{bf}\left(x_{ba} + x_{bf}\right) \tan \beta_f = \pm\left[P_y - x_{ba}\frac{r + h + e}{r + h} + M_\psi\right] \tag{5}$$

$$V_{ba}\left(x_{ba} + x_{bf}\right) \tan \beta_a = \pm\left[-P_y \cdot x_{bf}\frac{r + h + e}{r + h} + M_\psi\right] \tag{6}$$

which appear in Ref. 1, and are programmed into subroutine HANGER/B. Programmed logic selects whichever sign on the square brackets gives a downward load on the store. These downward vertical loads, V_{ba} and V_{bf}, are subsequently included in moment summations in the plane of symmetry.

An enumeration of assumptions built into Eq. 5 and 6 is as follows:

1. Sway braces take all loads and moments in the store's lateral plane.

2. Side loads on the lugs are due only to rolling moments about the intersection of the sway brace lines of action (see Eq. 3).

3. Side loads are prorated between the lugs in inverse proportion to their distances from the store center of gravity.

Preliminary moment summations are made about each of the lugs under an initial assumption that both lugs are loaded in tension. This assumption is later tested and modified, if necessary. Moments in the plane of symmetry about the aft lug are

$$R_{zf,trial}\left(x_a + x_{bf}\right) = P_x\,(r + c + e) - P_z \cdot x_a - M_\theta$$
$$+ V_{bf}\left(x_a + x_{bf}\right) - V_{ba}\left(x_{ba} - x_a\right)$$

and about the forward lug

$$R_{za,trial}\left(x_a + x_f\right) = M_\theta - P_x\,(r + c + e) - P_z \cdot x_f$$

$$+ V_{ba}\left(x_f + x_{ba}\right) - V_{bf}\left(x_{bf} - x_f\right)$$

A negative value for either R_{za} or R_{zf} produced by these trial moment balances warns us to modify our moment balance to reflect the fact that only sway braces, and not lugs, take compressive loads. The combination of signs on R_{za} and R_{zf} tells us how to make the needed modifications. The following explanation of the required logic follows the pattern of the computer program to make the program easier to follow, although at some expense to clarity in order of explanation.

R_{za} and R_{zf}, both positive, indicate lugs in tension and sway braces taking only loads due to side forces and yawing moments--an acceptable circumstance. Under these conditions, the trial moment balances are accepted. At this point the computer also heaps all longitudinal load on the most heavily loaded lug, in accordance with the recommendations of Ref. 1.

Specifically, if $R_{za} \geq R_{zf}$,

$$R_{xf} = 0.0$$

$$R_{xa} = P_x$$

and if $R_{za} < R_{zf}$,

$$R_{xf} = P_x$$

$$R_{xa} = 0.0$$

Under the current loading condition of both lugs in tension and taking all external loads in the store plane of symmetry, no more load is carried by sway braces than loads already allotted to them--namely, all loads and moments in the store's lateral plane. Consistent with

previous assumptions, then, we will have loads on only one forward sway brace and only one aft. That is,

$$RBFMX = V_{bf}/\cos \beta_f$$

$$RBFMN = 0.0$$

$$RBAMX = V_{ba}/\cos \beta_a$$

$$RBAMN = 0.0$$

without saying yet on which side the sway braces are loaded.

R_{zf} positive and R_{za} negative indicate that the trial moment balance about the aft lug needs to be replaced by a similar moment balance about the aft sway brace, and that the forward sway brace must take additional load. The new moment balance in the plane of symmetry reads

$$R_{zf}\left(x_f + x_{ba}\right) = P_x\,(r + c + e) - P_z \cdot x_{ba} - M_\theta + V_{bf}\left(x_{ba} + x_{bf}\right)$$

However, since lugs do not take compressive loads,

$$R_{za} = 0.0$$

and the aft sway brace accepts the aft lug's share.

Balancing moments about the forward lug,

$$\left.\begin{matrix} RBAMX \\ RBAMN \end{matrix}\right\} = \frac{\left[P_z \cdot x_f + P_x\,(r + c + e) - M_\theta + V_{bf}\left(x_{bf} - x_f\right)\right]}{\left[\left(x_f + x_{ba}\right)\left(2 \cos \beta_a\right)\right]}$$

$$\pm V_{ba}/\left(2 \cos \beta_a\right)$$

All longitudinal load is heaped upon the forward lug

$$R_{xf} = P_x$$

$$R_{xa} = 0.0$$

and the forward sway brace is loaded as before

$$RBFMX = V_{bf}/\cos \beta_f$$

$$RBFMN = 0.0$$

where one forward sway brace takes all the load due to external lateral forces and moments, and nothing more.

A third load situation is treated like the one just discussed, but this time for R_{zf} negative and R_{za} positive. Briefly, the pertinent equations are

$$R_{zf} = 0.0$$

$$R_{za}\left(x_a + x_{bf}\right) = M_\theta - P_x\,(r + c + e) - P_z \cdot x_{bf} + V_{ba}\left(x_{ba} + x_{bf}\right)$$

$$R_{xa} = P_x$$

$$R_{xf} = 0.0$$

$$\left.\begin{matrix}\text{RBFMX}\\ \text{RBFMN}\end{matrix}\right\} = \frac{\left|P_z \cdot x_a - P_x\,(r + c + e) + M_\theta + V_{ba}\left(x_{va} - x_a\right)\right|}{\left|\left(x_a + x_{bf}\right)\left(2 \cos \beta_f\right)\right|}$$

$$\pm\ V_{bf}/2 \cos \beta_f$$

$$\text{RBAMX} = V_{ba}/\cos \beta_a$$

$$\text{RBAMN} = 0.0$$

where moments in the symmetry plane are taken about the forward sway brace and about the aft lug.

The fourth and last load situation is indicated by both trial moment balances producing negative trial vertical lug loads. Such an unacceptable situation must be corrected by replacing both moment balances by balances about the sway brace stations. In accordance with the contention that lugs shall not take compressive loads,

$$R_{zf} = 0.0$$

$$R_{za} = 0.0$$

Balancing moments about the aft sway brace,

$$\left.\begin{array}{l}RBFMX\\RBFMN\end{array}\right\} = \frac{\left[P_z \cdot x_{ba} + M_\theta - P_x\,(r + c + e)\right]}{\left[\left(x_{bf} + x_{ba}\right)\left(2 \cos \beta_f\right)\right]} \pm \frac{V_{bf}}{2 \cos \beta_f}$$

and about the forward sway brace,

$$\left.\begin{array}{l}RBAMX\\RBAMN\end{array}\right\} = \frac{\left[P_z \cdot x_{bf} - M_\theta + P_x\,(r + c + e)\right]}{\left[\left(x_{ba} + x_{bf}\right)\left(2 \cos \beta_a\right)\right]} \pm \frac{V_{ba}}{2 \cos \beta_a}$$

Reference 1 does not seem to account for longitudinal loads when neither lug is loaded in the "Z" direction--except to specify that sway braces shall take only compressive loads. Other subroutines will expect forces to balance, so all longitudinal load will arbitrarily be heaped onto the aft lug.

$$R_{xf} = P_x$$

$$R_{xa} = 0.0$$

No particular motivation for this arbitrary decision is involved, other than a preference for simplicity. A void needed to be filled, and this manner of filling it is probably no less realistic than another.

Having taken care of the four possible load situations in the symmetry plane, lateral loads on lugs are next attended to. Referring back to Eq. 3 and 4, but this time solving for R_{yf} and R_{ya},

$$R_{yf} = \frac{P_y \cdot e \cdot x_a}{(r + h)\left(x_a + x_f\right)}$$

$$R_{ya} = \frac{P_y \cdot e \cdot x_f}{(r + h)\left(x_a + x_f\right)}$$

Assumptions incorporated in Eq. 3 and 4 certainly still affect these lateral lug loads.

All hanger loads have been found, except for the determination of which sway braces are more heavily loaded. Furthermore, a concentrated moment in the symmetry plane due to longitudinal load will be needed by other subroutines. Resultant sway brace loads in the symmetry plane are

$$RFSBZ = -(RBFMN + RBFMX) \cdot \cos \beta_f$$

$$RRSBZ = -(RBAMN + RBAMX) \cdot \cos \beta_a$$

The following roundabout way of computing lateral resultants of sway brace loads is further evidence that this subroutine was pressed into a service here beyond its original intent. The absolute value of the total sway brace load in the "Y" direction is computed

$$RFSBY = \left|(RBFMX - RBFMN) \cdot \sin \beta_f\right|$$

to which is affixed a sign opposite that of the lateral moment

$$P_y \cdot \frac{(r + h + e)}{(r + h)} \cdot x_{bf} + M_\psi$$

Likewise, to the magnitude of the rear sway braces' lateral resultant

$$RRSBY = \left|(RBAMX - RBAMN) \cdot \sin \beta_a\right|$$

is affixed a sign opposite to the lateral moment

$$P_y \cdot \left|\frac{(r + h + e)}{(r + h)}\right| \cdot x_{bf} - M_\psi$$

Computation of concentrated hanger induced moment in the symmetry plane and its location is as follows

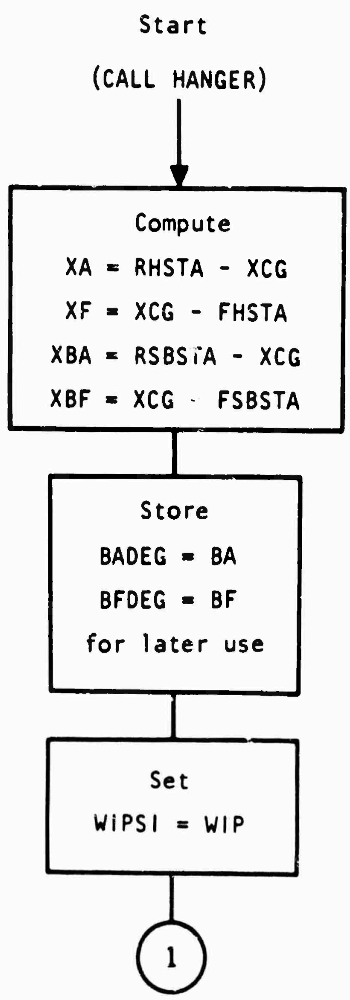
$$HM = -P_x \cdot (r + c + e)$$

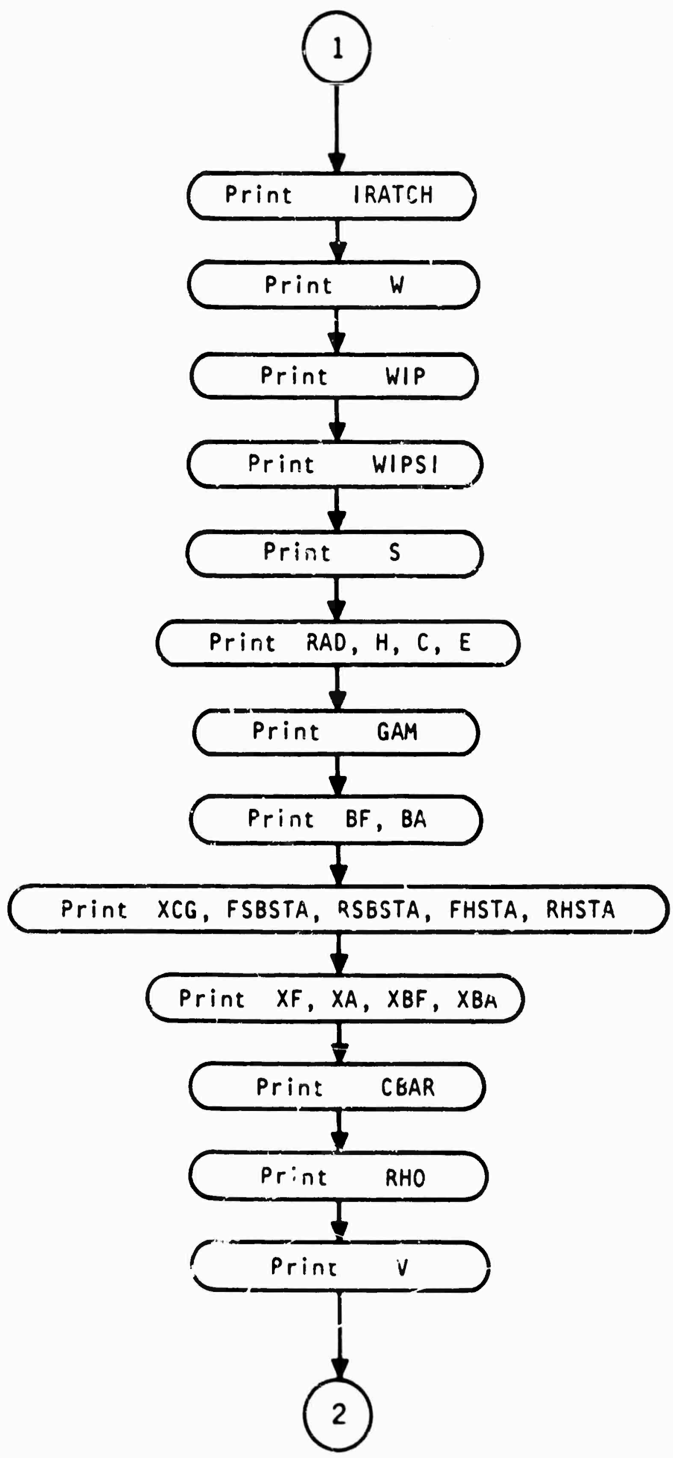
$$ISHM = ISFHGR \qquad \text{if } R_{xf} \neq 0$$

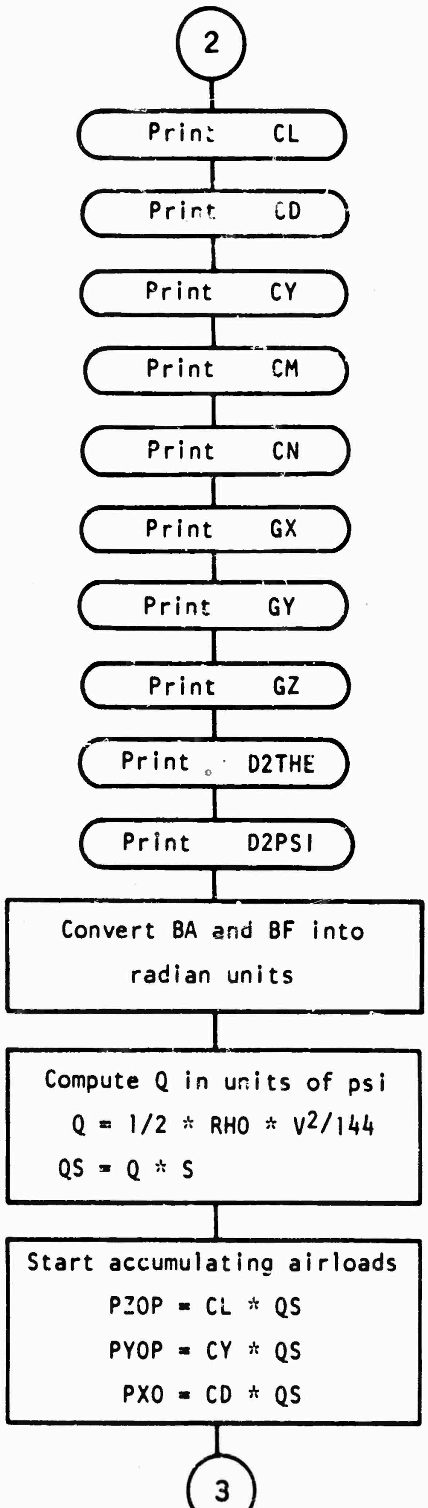
$$ISHM = ISRHGR \qquad \text{if } R_{xa} \neq 0$$

Nothing remains in this subroutine other than output of hanger loads, including some commentary describing which sway brace is most heavily loaded.

FLOW CHART


Start
(CALL HANGER)
Compute
XA = RHSTA - XCG
XF = XCG - FHSTA
XBA = RSBSTA - XCG
XBF = XCG - FSBSTA
Store
BADEG = BA
BFDEG = BF
for later use
Set
WIPSI = WIP
1


1
Print IRATCH
Print W
Print WIP
Print WIPSI
Print S
Print RAD, H, C, E
Print GAM
Print BF, BA
Print XCG, FSBSTA, RSBSTA, FHSTA, RHSTA
Print XF, XA, XBF, XBA
Print CBAR
Print RHO
Print V
2


2
Print CL
Print CD
Print CY
Print CM
Print CN
Print GX
Print GY
Print GZ
Print D2THE
Print D2PSI
Convert BA and BF into radian units
Compute Q in units of psi
Q = 1/2 * RHO * V2/144
QS = Q * S
Start accumulating airloads
PZOP = CL * QS
PYOP = CY * QS
PXO = CD * QS
3

3

Make coordinate transformation of accelerations to store--referenced system

$$ZNP = GZ * COS \left(\frac{\pi}{180} * GAM\right) + GY * SIN \left(\frac{\pi}{180} * GAM\right)$$

$$YNP = GY * COS \left(\frac{\pi}{180} * GAM\right) - GZ * SIN \left(\frac{\pi}{180} * GAM\right)$$

$$PITNP = D2THE * COS \left(\frac{\pi}{180} * GAM\right) + D2PSI * SIN \left(\frac{\pi}{180} * GAM\right)$$

$$YAWNP = D2PSI * COS \left(\frac{\pi}{180} * GAM\right) - D2THE * SIN \left(\frac{\pi}{180} * GAM\right)$$

Store transformed accelerations into proper location for convenient later use

GZ = ZNP

GY = YNP

D2THE = PITNP

D2PSI = YAWNP

Accumulate inertia loads into forces imposed upon store

PZ = -ZNP * W + PZOP

PY = -YNP * W + PYOP

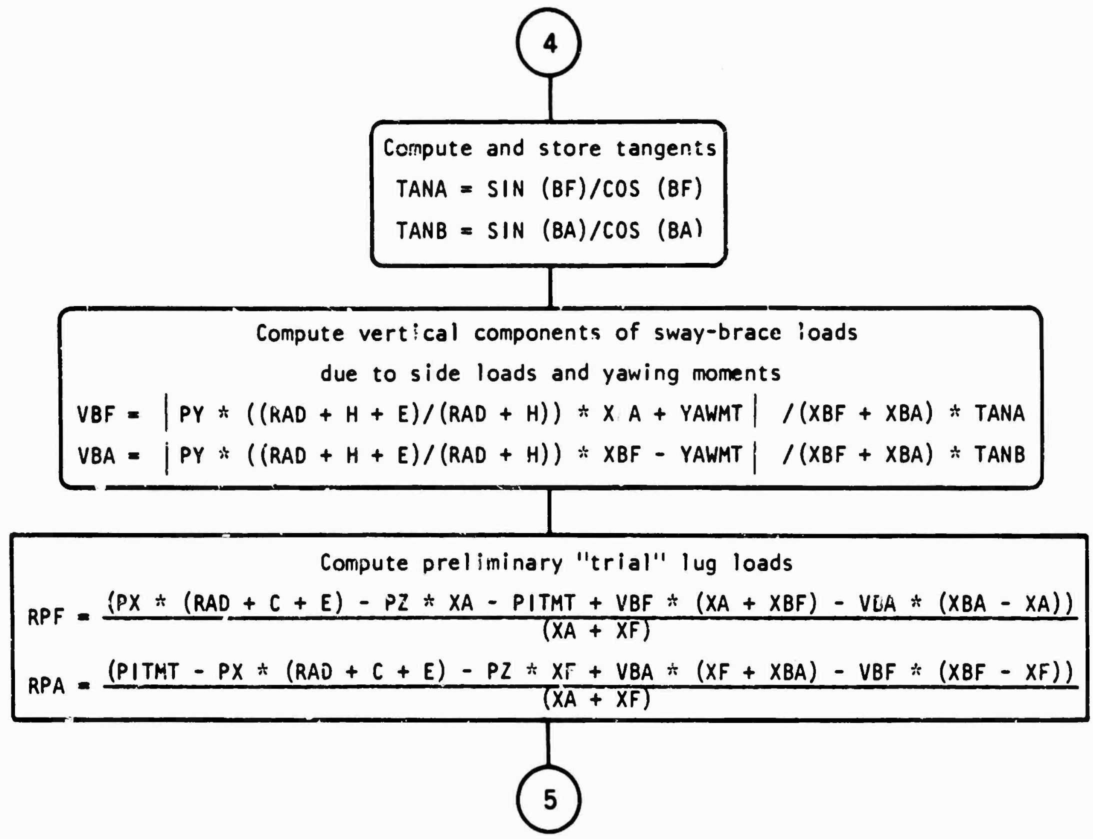
PX = GY * W + FXO

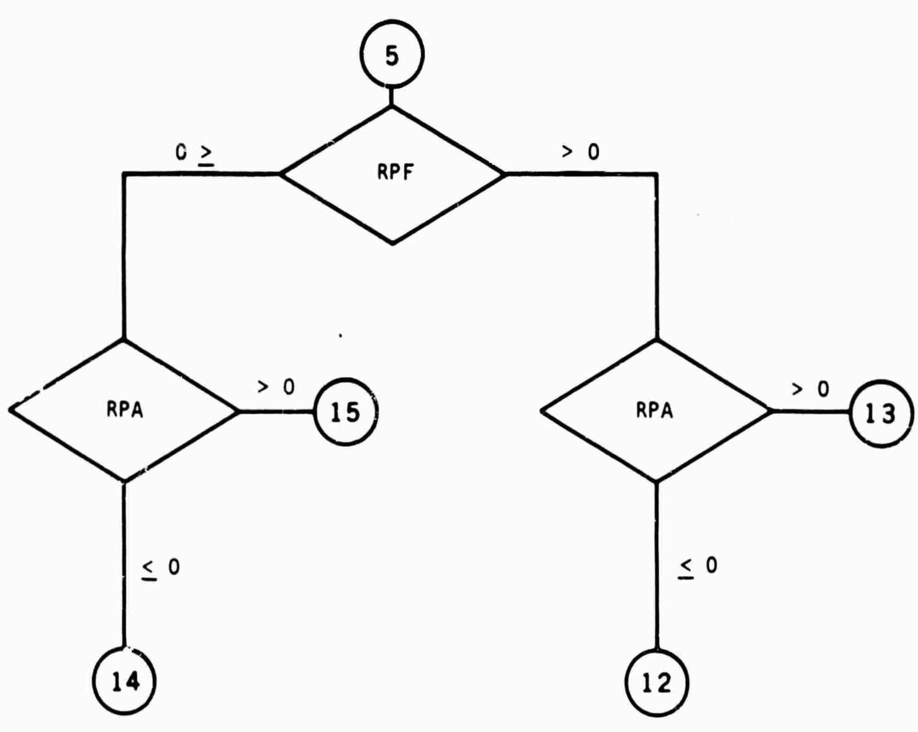
Compute moments imposed upon store

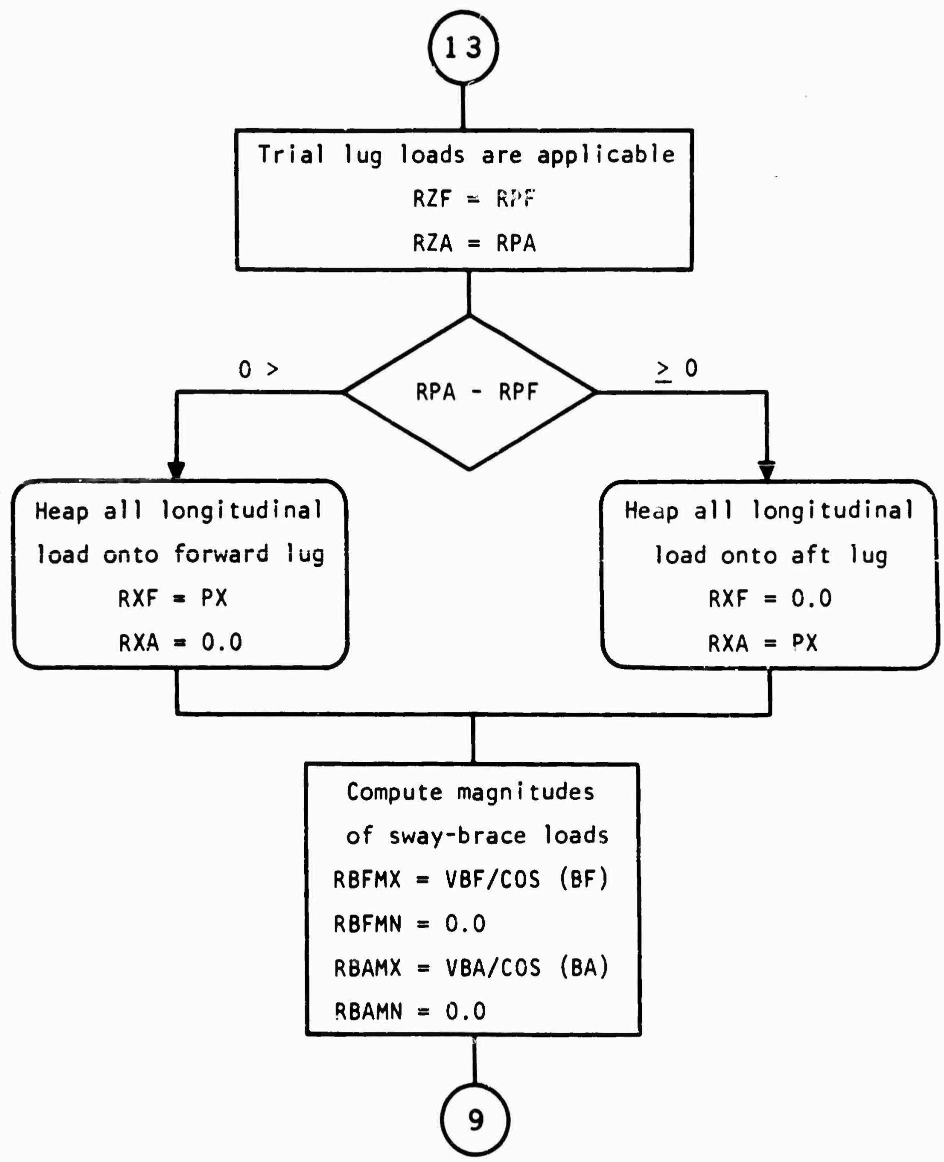
YAWMT = -YAWNP * WIPSI/386.088 + CN * QS * CBAR

PITMT = -PITNP * WIP/386.088 + CM * QS * CBAR

4


4
Compute and store tangents
TANA = SIN (BF)/COS (BF)
TANB = SIN (BA)/COS (BA)
Compute vertical components of sway-brace loads
due to side loads and yawing moments
VBF = | PY * ((RAD + H + E)/(RAD + H)) * X A + YAWMT | /(XBF + XBA) * TANA
VBA = | PY * ((RAD + H + E)/(RAD + H)) * XBF - YAWMT | /(XBF + XBA) * TANB
Compute preliminary "trial" lug loads
RPF = (PX * (RAD + C + E) - PZ * XA - PITMT + VBF * (XA + XBF) - VBA * (XBA - XA)) / (XA + XF)
RPA = (PITMT - PX * (RAD + C + E) - PZ * XF + VBA * (XF + XBA) - VBF * (XBF - XF)) / (XA + XF)
5


5
RPF
0 ≥
> 0
RPA
> 0
15
≤ 0
14
RPA
> 0
13
≤ 0
12


13
Trial lug loads are applicable
RZF = RPF
RZA = RPA
RPA - RPF
0 >
≥ 0
Heap all longitudinal
load onto forward lug
RXF = PX
RXA = 0.0
Heap all longitudinal
load onto aft lug
RXF = 0.0
RXA = PX
Compute magnitudes
of sway-brace loads
RBFMX = VBF/COS (BF)
RBFMN = 0.0
RBAMX = VBA/COS (BA)
RBAMN = 0.0
9

(12)

Trial lug loads are not applicable

```
        (PX * (RAD + C + E) - PZ * XBA - PITMT + VBF * (XBA + XBF))
RZF =  -------------------------------------------------------------
                               (XF + XBA)

RZA = 0.0
```

Heap all longitudinal load onto forward lug

```
RXF = PX

RXA = 0.0
```

Compute magnitudes of sway-brace loads

```
RBFMX = VBF/COS (BF)

RBFMN = 0.0

          (PZ * XF + PX * (RAD + C + E) - PITMT) + VBF * (XBF - XF)
RBAMX =  -----------------------------------------------------------
                       (XF + XBA) * 2.0 * COS (BA)

                         + VBA/2.0 * COS (BA)

          (PX * XF + PX * (RAD + C + E) - PITMT) + VBF * (XBF - XF)
RBAMN =  -----------------------------------------------------------
                       (XF + XBA) * 2.0 * COS (BA)

                         - VBA/2.0 * COS (BA)
```

(9)

15

Trial lug loads not applicable

RZF = 0.0

$$RZA = \frac{(PITMT - PX * (RAD + C + E) - PZ * XBF + VBA * (XBA + XBF))}{(XA + XBF)}$$

Heap all longitudinal load onto aft lug

RXA = PX

RXF = 0.0

Compute magnitude of sway-brace loads

$$RBFMX = \frac{(PZ * XA - PX * (RAD + C + E) + PITMT + VBA * (XBA - XA))}{(XA + XBF) * 2.0 * COS\ (BF)} + \frac{VBF}{2.0 * COS\ (BF)}$$

$$RBFMN = \frac{(PZ * XA - PX * (RAD + C + E) + PITMT + VBA * (XBA - XA))}{(XA + XBF) * 2.0\ COS\ (BF)} - \frac{VBF}{2.0 * COS\ (BF)}$$

RBAMX = VBA/COS (BA)

RBAMN = 0.0

9

(14)

Trial lug loads not applicable

RZF = 0.0

RZA = 0.0

Compute magnitude of sway-brace loads

$$RBFMX = \frac{(PZ * XBA + PITMT - PX * (RAD + C + E))}{(XBF + XBA) * 2.0 * COS\ (BF)} + \frac{VBF}{2.0 * COS\ (BF)}$$

$$RBFMN = \frac{(PZ * XBA + PITMT - PX * (RAD + C + E))}{(XBF + XBA) * 2.0 * COS\ (BF)} - \frac{VBF}{2.0 * COS\ (BF)}$$

$$RBAMX = \frac{(PZ * XBF - PITMT + PX * (RAD + C + E))}{(XBF + XBA) * 2.0 * COS\ (BA)} + \frac{VBA}{2.0 * COS\ (BA)}$$

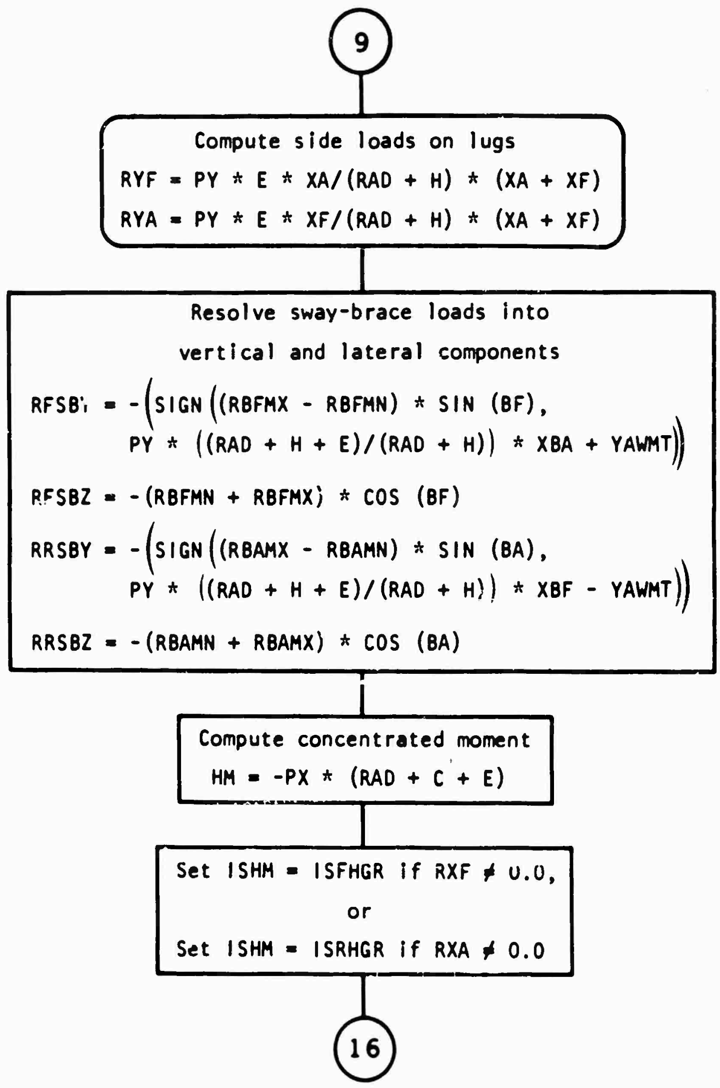
$$RBAMN = \frac{(PZ * XBF - PITMT + PX * (RAD + C + E))}{(XBF + XBA) * 2.0 * COS\ (BA)} - \frac{VBA}{2.0 * COS\ (BA)}$$

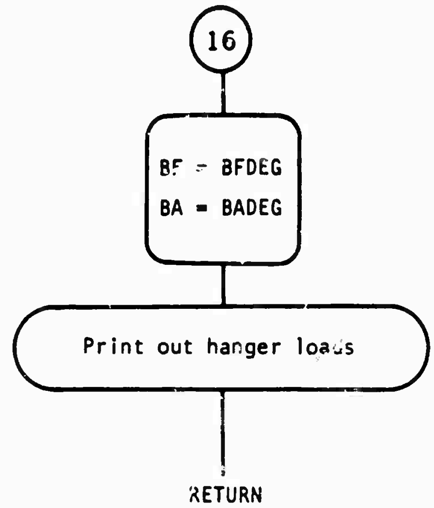
Heap all longitudinal load onto forward lug

RXF = PX

RXA = 0.0

(9)


9
Compute side loads on lugs
RYF = PY * E * XA/(RAD + H) * (XA + XF)
RYA = PY * E * XF/(RAD + H) * (XA + XF)
Resolve sway-brace loads into
vertical and lateral components
RFSBY = -(SIGN((RBFMX - RBFMN) * SIN (BF),
PY * ((RAD + H + E)/(RAD + H)) * XBA + YAWMT))
RFSBZ = -(RBFMN + RBFMX) * COS (BF)
RRSBY = -(SIGN((RBAMX - RBAMN) * SIN (BA),
PY * ((RAD + H + E)/(RAD + H)) * XBF - YAWMT))
RRSBZ = -(RBAMN + RBAMX) * COS (BA)
Compute concentrated moment
HM = -PX * (RAD + C + E)
Set ISHM = ISFHGR if RXF ≠ 0.0,
or
Set ISHM = ISRHGR if RXA ≠ 0.0
16



LISTING OF HANGER/B

A FORTRAN IV or V listing of HANGER/B follows. Discussion of input data and output results will be deferred to the Appendix.

```
      SUBROUTINE HANGER(RZF,RYF,RZA,RYA,HM,RFSBZ,RFSBY,RRSBZ,RRSBY)
C     CALCULATION OF LUG AND SWAY'BRACE LOADS FOR STORES IN
C     ACCORDANCE WITH MILITARY SPECIFICATION MIL'A'8591
C     ALL LENGTHS ARE IN INCHES AND FORCES ARE IN POUNDS.
C     ALL ANGLES ARE IN DEGREES.
      DIMENSION A(25),Z12(25),N(25),NOPT(25),Z13(25),Z14(25),X(41,25)
     1,DELCP(41,25),D(41,25),Z15(25),Z16(25),Z17(41,25),AERO(41,25)
     2,XISECT(41,25),Z18(25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      COMMON W,WIP,D2THE,D2PSI,GX,GY,GZ,H,C,E,B,CBAR,S,RHO,V
     1,CL,CM,CY,CN,CD,ARC,Q,ISEGS,A,Z12,N,NOPT,Z13,Z14,X,DELCP,D
     2,Z15,Z16,Z17,AERO,XISECT,XCG,IPLANE,IBATCH,Z18,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
 2001 FORMAT (1H1)
 2002 FORMAT (53H HANGER LOADS ON MISSILE, UP AND STARBD ARE POSITIVE)
 2143 FORMAT (5H CASE,I6)
 2003 FORMAT (//24H MISSILE CHARACTERISTICS)
 2004 FORMAT (/10H WEIGHT = ,E12.5,4H LBS)
 2005 FORMAT (17H PITCH INERTIA = ,E12.5,9H LB'IN**2)
 2006 FORMAT (15H YAW INERTIA = ,E12.5,9H LB'IN**2)
 2007 FORMAT (18H REFERENCE AREA = ,F12.5,6H SQ.IN)
 2008 FORMAT (//38H HANGER DIMENSIONS, INCHES AND DEGREES)
 2009 FORMAT (48H RADIUS            H            C            E       )
 2010 FORMAT (1H ,6E12.4)
 2144 FORMAT (/14H CANT ANGLE = ,E12.5, 8H DEGREES)
 2145 FORMAT (27H SWAY BRACE ANGLES, DEGREES)
 2146 FORMAT (24H FOWD BETA     AFT BETA   )
 2147 FORMAT(/60H CG STA.      FSBSTA      RSBSTA      F HGR STA    R HGR
     1 STA )
```

```
      2011 FORMAT (/20H MOMENT ARMS, INCHES)
      2012 FORMAT (48H XF              XA              XBF              )
      2014 FORMAT (/26H REFERENCE LENGTH , INCHES)
      2015 FORMAT ( 8H CBAR = ,E12.4)
      2019 FORMAT (//17H AERODYNAMIC DATA)
      2016 FORMAT (/7H RHO = ,E12.5,12H SLUGS/CU FT)
      2017 FORMAT (5H V = ,E12.5,11H FT/SEC TAS)
      2018 FORMAT (21H NORMAL FORCE COEF = ,E12.5)
      2020 FORMAT (13H DRAG COEF = ,E12.5)
      2021 FORMAT (20H LATERAL FORCE COEF ,E12.5)
      2022 FORMAT (21H PITCH MOMENT COEF = ,E12.5)
      2023 FORMAT (19H YAW MOMENT COEF = ,E12.5)
      2024 FORMAT (/13H LOAD FACTORS)
      2025 FORMAT ( 6H GX = ,F12.5)
      2026 FORMAT ( 6H GY = ,F12.5)
      2027 FORMAT ( 6H GZ = ,F12.5)
      2028 FORMAT (/49H ANGULAR ACCELERATIONS, RADIANS PER SQUARE SECOND)
      2030 FORMAT (20H THETA DOUBLE DOT = ,E12.5)
      2031 FORMAT (18H PSI DOUBLE DOT = ,E12.5)
      2032 FORMAT (//20H DYNAMIC PRESSURE = ,E12.5,11H LBS/SQ.IN.)
      2033 FORMAT (////13H HANGER LOADS)
      2034 FORMAT (/ 9H RZF    = ,E12.5,4H LBS)
      2035 FORMAT ( 9H RZA    = ,E12.5,4H LBS)
      2036 FORMAT ( 9H RYF    = ,E12.5,4H LBS)
      2037 FORMAT ( 9H RYA    = ,E12.5,4H LBS)
      2038 FORMAT ( 9H RXA    = ,E12.5,4H LBS)
      2039 FORMAT ( 9H RXF    = ,E12.5,4H LBS)
      2040 FORMAT ( 9H RFSBZ = ,E12.5,4H LBS)
      2041 FORMAT ( 9H RRSBZ = ,E12.5,4H LBS)
      2042 FORMAT ( 9H RFSBY = ,E12.5,4H LBS)
      2043 FORMAT ( 9H RRSBY = ,E12.5,4H LBS)
      2044 FORMAT ( 6H HM = ,E12.5,14H LB'IN AT NO. ,I3, 8H SEGMENT)
      2045 FORMAT (/17H SWAY BRACE LOADS)
      2046 FORMAT ( 9H RBFMX = ,E12.5,4H LBS)
      2047 FORMAT ( 9H RBFMN = ,E12.5,4H LBS)
      2048 FORMAT (9H RBAMX = ,E12.5,4H LBS)
      2049 FORMAT ( 9H RBAMN = E12.5,4H LBS)
        22 FORMAT (29H RBAMX IS AT RIGHT REAR BRACE////)
        23 FORMAT (28H RBAMX IS AT LEFT REAR BRACE////)
        56 FORMAT (30H RBFMX IS AT RIGHT FRONT BRACE)
        57 FORMAT (29H RBFMX IS AT LEFT FRONT BRACE)
           XA = RHSTA - XCG
           XF = XCG - FHSTA
           XBA = RSBSTA - XCG
           XBF = XCG - FSBSTA
           BADEG = BA
           BFDEG = BF
           WIPSI = WIP
           WRITE (6,2001)
           WRITE (6,2002)
           WRITE (6,2143) IBATCH
           WRITE (6,2003)
           WRITE (6,2004)W
           WRITE (6,2005) WIP
           WRITE (6,2006) WIPSI
           WRITE (6,2007) S
           WRITE (6,2008)
           WRITE (6,2009)
```

```
      WRITE (6,2010) RAD, H, C, E
      WRITE (6,2144) GAM
      WRITE (6,2145)
      WRITE (6,2146)
      WRITE (6,2010) BF, BA
      WRITE (6,2147)
      WRITE (6,2010) XCG, FSBSTA, RSBSTA, FHSTA, RHSTA
      WRITE (6,2011)
      WRITE (6,2012)
      WRITE (6,2010) XF, XA, XBF, XBA
      WRITE (6,2014)
      WRITE (6,2015) CBAR
      WRITE (6,2019)
      WRITE (6,2016) RHO
      WRITE (6,2017) V
      WRITE (6,2018) CL
      WRITE (6,2020) CD
      WRITE (6,2021)CY
      WRITE (6,2022) CM
      WRITE (6,2023) CN
      WRITE (6,2024)
      WRITE (6,2025) GX
      WRITE (6,2026) GY
      WRITE (6,2027) GZ
      WRITE (6,2028)
      WRITE (6,2030) D2THE
      WRITE (6,2031) D2PSI
  105 BA = BA * 0.0174533
      BF = BF * 0.0174533
      Q = 0.5 * RHO *(V**2)/144.0
      QS=Q*S
      PZOP = CL * QS
      PYOP = CY * QS
      PXO=CD*QS
      ZNP = GZ*COS(0.0174533*GAM) + GY*SIN(0.0174533*GAM)
      YNP = GY*COS(0.0174533*GAM) - GZ*SIN(0.0174533*GAM)
      PITNP = D2THE*COS(0.0174533*GAM) + D2PSI*SIN(0.0174533*GAM)
      YAWNP = D2PSI*COS(0.0174533*GAM) - D2THE*SIN(0.0174533*GAM)
      GZ = ZNP
      GY = YNP
      D2THE = PITNP
      D2PSI = YAWNP
      PZ = -ZNP*W + PZOP
      PY = -YNP*W + PYOP
      PX = GX*W + PXO
      YAWMT =-YAWNP*WIPSI/386.088 + CN*QS*CBAR
      PITMT =-PITNP*WIP/386.088 + CM*QS*CBAR
      TANA=SIN(BF)/COS(BF)
      TANB=SIN(BA)/COS(BA)
   81 GS = PY*((RAD+H+E)/(RAD+H))*XBA+YAWMT
      IF (GS) 2,2,3
    2 GF=-GS
      GO TO 99
    3 GF = GS
   99 GT = PY*((RAD+H+E)/(RAD+H))*XBF-YAWMT
      IF(GT)4,4,5
    4 GA = -GT
      GO TO 98
```

```
      5 GA = GT
     98 VBF=GF/((XBF+XBA)*(TANA))
        VBA=GA/((XBF+XBA)*(TANB))
        CA = PX*(RAD+C+E)
        CB=VBF*(XA+XBF)
        CC=VBA*(XBA-XA)
        RPF=(CA-PZ*XA-PITMT+CB-CC)/(XA+XF)
        CDE=VBA*(XF+XBA)
        CE=VBF*(XBF-XF)
        RPA=(PITMT-CA-PZ*XF+CDE-CE)/(XA+XF)
     44 IF(RPF) 10,10,11
     11 IF(RPA) 12,12,13
     10 IF(RPA) 14,14,15
     13 RZF=RPF
        RZA=RPA
C       IMPOSING ALL FORE'AFT LOAD ON LUG WITH GREATEST VERTICAL LOAD
C       AS PER MIL'A'8591C,PART 20.5,1(B), PAGE 19
        IF (RPA - RPF) 1002,1001,1001
   1002 RXF = PX
        RXA = 0.0
        GO TO 1003
   1001 RXF = 0.0
        RXA = PX
   1003 CONTINUE
        RBFMX=VBF/(COS(BF))
        RBFMN=0.0
        RBAMX=VBA/COS(BA)
        RBAMN=0.0
        GO TO 90
     12 RZF=(CA-PZ*XBA-PITMT+VBF*(XBA+XBF))/(XF+XBA)
        RZA=0.0
        RXF=PX
        RXA=0.00
        RBFMX=VBF/COS(BF)
        RBFMN=0.0
        CH=(XF+XBA)
        CI=(PZ*XF+CA-PITMT+CE)/((CH)*(2.*COS(BA)))
        RBAMX=CI+(VBA/(2.*COS(BA)))
        RBAMN=CI-(VBA/(2.*COS(BA)))
        GO TO 90
     15 RZF=0.0
        RZA=(PITMT-CA-PZ*XBF+VBA*(XBA+XBF))/(XA+XBF)
        RXA=PX
        RXF=0.0
        CJ=(XA+XBF)
        CK=(PZ*XA-CA+PITMT+CC)/((CJ)*(2.*COS(BF)))
        RBFMX=CK+(VBF/(2.*COS(BF)))
        RBFMN=CK-(VBF/(2.*COS(BF)))
        RBAMX=VBA/(COS(BA))
        RBAMN=0.0
        GO TO 90
     14 RZF=0.0
        RZA=0.00
        RBFMX=(PZ*XBA+PITMT-CA)/((XBF+XBA)*2.0*COS(BF))
       1  +(VBF/(2.0*COS(BF)))
        RBFMN=(PZ*XBA+PITMT-CA)/((XBF+XBA)*2.0*COS(BF))
       1 -(VBF/(2.0*COS(BF)))
        CN=(PZ*XBF-PITMT+CA)/(2.*(XBF+XBA)*COS(BA))
```

```
      RBAMX=CN+(VBA/(2.*COS(BA)))
      RBAMN=CN-(VBA/(2.*COS(BA)))
C      ARBITRARILY IMPOSING ALL LONGITUDINAL LOAD ONTO FORWARD LUG        *
      RXF = PX                                                           *
      RXA=0.0                                                            *
   90 CONTINUE
      RYF=(PY*E*XA)/((RAD+H)*(XA+XF))
      RYA=(PY*E*XF)/((RAD+H)*(XA+XF))
      RFSBY =-(SIGN((RBFMX - RBFMN)*SIN(BF), GS))                        *
      RFSBZ =-(RBFMN + RBFMX)*COS(BF)                                    *
      RRSBY =-(SIGN ((RBAMX - RBAMN)*SIN(BA), GT))                       *
      RRSBZ =-(RBAMN+RBAMX)*COS(BA)                                      *
      HM =-CA
      ISHM = 0
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
      IF (RXF .NE. 0.0) GO TO 6
      GO TO 7
    6 ISHM = ISFHGR
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
    7 IF (RXA .NE. 0.0) GO TO 8
      GO TO 9
    8 ISHM  = ISRHGR
    9 CONTINUE
      BF = BFDEG
      BA = BADEG
      WRITE (6,2032) Q
      WRITE (6,2033)
      WRITE (6,2034) RZF
      WRITE (6,2035) RZA
      WRITE (6,2036) RYF
      WRITE (6,2037) RYA
      WRITE (6,2038) RXA
      WRITE (6,2039) RXF
      WRITE (6,2040) RFSBZ
      WRITE (6,2041) RRSBZ
      WRITE (6,2042) RFSBY
      WRITE (6,2043) RRSBY
      WRITE (6,2044) HM, ISHM
      WRITE (6,2045)
      WRITE (6,2046) RBFMX
      WRITE (6,2047) RBFMN
      WRITE (6,2048) RBAMX
      WRITE (6,2049) RBAMN
      IF(GS)53,54,55
   53 WRITE (6,57)
      GO TO 58
   55 WRITE (6,56)
   58 IF(GT) 20,54,21
   20 WRITE (6,23)
      GO TO 54
   21 WRITE (6,22)
   54 CONTINUE
      WRITE (6,2001)
      RETURN
      END

END OF UNIVAC 1108 FORTRAN V COMPILATION.     2 *DIAGNOSTIC* MESSAGE(S)
GER  B        SYMBOLIC                                    18 SEP 67
                                                          10:04:20    0   014
```

INPUT DATA

HANGER/B has no input of its own. All data it requires is furnished by MAIN through a COMMON specification.

OUTPUT DATA

HANGER/B prints out input data presented to it by MAIN and values of hanger loads computed within itself. Three components of each lug's loads, a concentrated moment due to longitudinal lug load, and two components of accumulated sway brace loads are all returned to MAIN through subroutine arguments. The location of the concentrated moment due to lug longitudinal load is returned through COMMON.

Printed Output

1. IBATCH
2. W
3. WIP
4. WIPSI
5. S
6. RAD, H, C, E
7. GAM
8. BF, BA
9. XCG, FSBSTA, RSBSTA, FHSTA, RHSTA
10. XF, XA, XBF XBA
11. CBAR
12. RHO
13. V
14. CL
15. CD
16. CY
17. CM
18. CN
19. GX
20. GY
21. GZ
22. D2THE
23. D2PSI
24. Q
25. RZF
26. RZA
27. RYF
28. RYA
29. RXA
30. RXF
31. RFSBZ
32. RRSBZ
33. RFSBY
34. RRSBY
35. HM, ISHM
36. RBFMX
37. RBFMN
38. RBAMX
39. RBAMN
40. Commentary on which of the sway braces are most heavily loaded

SUBROUTINE ALLPTS

ALLPTS is a simple linear interpolation subroutine. Given Cartesian endpoint coordinates and an intermediate abscissa, the subroutine will return a corresponding interpolated ordinate.

Entry to ALLPTS is made from other program segments through the FORTRAN subroutine call: CALL ALLPTS (X, Y, XA, YA, XB, YB).

The first, third, fourth, fifth, and sixth arguments are furnished to the subroutine through the CALL. The second argument is the interpolated ordinate generated by the subroutine.

SYMBOLS AND UNITS FOR ALLPTS

Algebraic symbol	FORTRAN equivalent	Definition
x	X	Intermediate abscissa for which an ordinate is to be interpolated (units of length, usually)
x_a	XA	Leftmost given abscissa (units of length, usually)
x_b	XB	Rightmost given abscissa (units of length, usually)
y	Y	Intermediate interpolated ordinate (units are arbitrary)
y_a	YA	Leftmost given ordinate (units are arbitrary)
y_b	YB	Rightmost given ordinate (units are arbitrary)

EQUATIONS

ALLPTS consists of but one equation:

$$y + y_a + \frac{y_b - y_a}{x_b - x_a} (x - x_a)$$

A sketch (Fig. 7) shows the motivation of this straight-line interpolation.

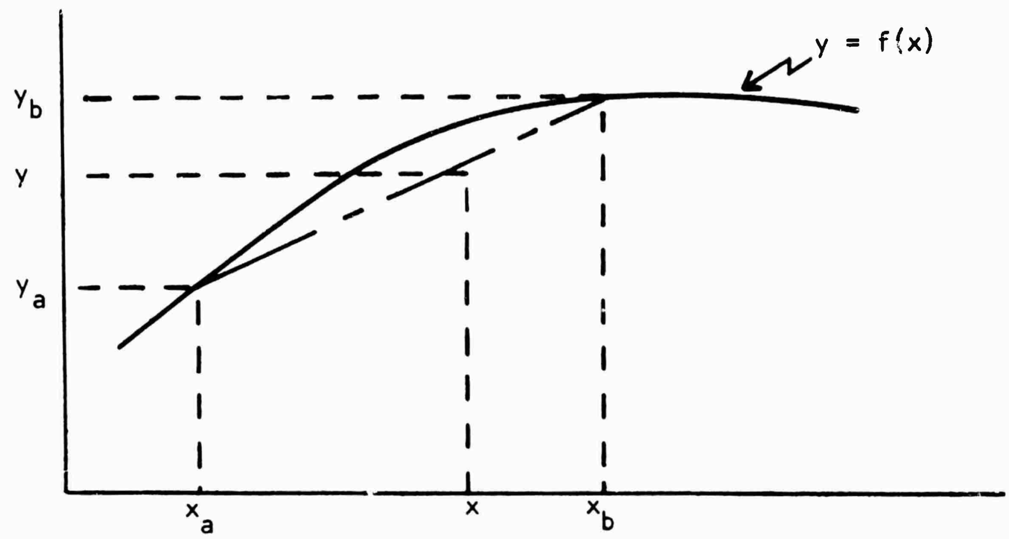


FIG. 7.

Obvious are errors which could arise from interpolating between too large an interval $x_b - x_a$, when $y = f(x)$ is not a straight-line relationship. However, straight-line relationships over long intervals for missiles and stores are fairly common in given representations of running weight, diameter distribution, etc. The justification for making this simplest of all interpolation schemes into a subroutine is to prepare for the day a higher-order interpolation is needed in its place.

LISTING OF ALLPTS

A FORTRAN IV or V listing of ALLPTS follows.

```
      SUBROUTINE ALLPTS (X, Y, XA, YA, XB, YB )
C     LINEAR INTERPOLATION SUBROUTINE FOR FILLING IN INTERMEDIATE POINTS
C     ON LOAD DIAGRAMS
      Y = YA + ((YB-YA)/(XB-XA)) * (X - XA)
      RETURN
      END
```

SUBROUTINE CONCLD

CONCLD computes and stores concentrated loads in locations readily accessible to other subroutines. Hanger loads (computed by subroutine HANGER) are a type of concentrated load treated by CONCLD, also aerodynamic loads on wings and fins are often considered point loads as far as a missile body is concerned. After hanger loads are first computed, loads are accumulated into each coordinate plane separately. CONCLD serves as a general procedure to prepare in-plane concentrated loads for integration into shear and moment diagrams.

ENTRY

Entry into CONCLD is made from MAIN through the FORTRAN subroutine call: CALL CONCLD (RFHGR, RRHGR, RFSB, RRSB, HM, ALPHA). The first four arguments are coplaner, parallel components of hanger loads, usually either in the weapon's lateral plane or in the symmetry plane. The fifth argument is a concentrated bending moment applied to the store, usually a moment in the symmetry plane due to a lug or detent taking longitudinal loads. The sixth argument is an aerodynamic flow angle, either angle of attack or angle of sideslip. These six arguments provide data to the subroutine--all returns of information from the subroutine are made through variables in COMMON.

SYMBOLS AND UNITS FOR CONCLD

Algebraic symbol	FORTRAN equivalent	Definition
$\bar{c}$	CBAR	Reference length for aerodynamic moment coefficient, usually body diameter for a store (inches)
$C_{L_{\alpha,fin}}$	FINCLA	Aerodynamic force curve slope of fin, indexed by IPLANE to denote whether force is lift or side force (per deg)
$C_{L_{\alpha,wing}}$	WNGCLA	Aerodynamic force curve slope of wing, indexed by IPLANE to denote whether force is lift or side force (per deg)
$C_{m_{\alpha,wing}}$	WNGCMA	Aerodynamic moment curve slope of wing, indexed by IPLANE to denote whether moment is pitching or yawing moment (per deg)

Algebraic symbol	FORTRAN equivalent	Definition
$C_{m_{\alpha},fin}$	FINCMA	Aerodynamic moment curve slope of fin, indexed by IPLANE to denote whether moment is pitching or yawing moment (per deg)
q	Q	Dynamic pressure (lb/in^2)
S	S	Aerodynamic reference area upon which coefficients are based, usually body cross-sectional area for a store (in^2)
	CONCAF(IS)	A concentrated aerodynamic force due to a wing or fin, indexed to denote a body segment in the aft end of which the load is located (units are usually lb)
	CONCAM(IS)	A concentrated aerodynamic moment due to a wing or fin, indexed to denote a body segment in the aft end of which the load is located (units are usually lb-in)
	CONCHL(IS)	A concentrated hanger load, indexed to denote a body segment in the aft end of which the load is located (units are usually lb)
	CONCHM(IS)	A concentrated hanger moment, indexed to denote a body segment in the aft end of which the load is located (units are usually lb-in)
	IPLANE	Loads are accumulated into shear and moment distributions one plane at a time. The index IPLANE denotes which of two planes (whose intersections determine the store's longitudinal axis) loads are to be associated with. Usually, IPLANE = 1 denotes the vertical (symmetry) plane, and IPLANE = 2 denotes the lateral plane
	IS	A store body is divided into segments for program organization purposes. IS is a variable address in which is stored an index denoting a particular body segment
	ISFHGR	An index denoting an IS body segment, in the aft end of which is located the forward hanger or lug

Algebraic symbol	FORTRAN equivalent	Definition
	ISFIN	An index denoting an IS body segment, in the aft end of which a concentrated load due to the fin is to be located
	ISFSB	An index denoting an IS body segment, in the aft end of which is located the forward sway brace
	ISHM	An index denoting an IS body segment, in the aft end of which is located a concentrated moment due to longitudinal load on a hanger or lug
	ISRHGR	An index denoting an IS body segment, in the aft end of which is located the aft hanger or lug
	ISRSB	An index denoting an IS body segment, in the aft end of which is located the aft sway brace
	ISWING	An index denoting an IS body segment, in the aft end of which a concentrated load due to the wing is to be located
	RFHGR	Forward hanger or lug reaction load components, vertical or lateral, depending on IPLANE (lb)
	RFSB	Forward sway brace reaction load component, vertical or lateral, depending on IPLANE (lb)
	RRHGR	Aft hanger or lug reaction load component, vertical or lateral, depending on IPLANE (lb)
	RRSB	Aft sway brace reaction load component, vertical or lateral, depending on IPLANE (lb)
α or β	ALPHA	Component of flow angle seen by store, may normally be angle of attack or angle of sideslip (deg)

EQUATIONS

Following is an outline of CONCLD's functions, and a sketch (Fig. 8) is given as an aid in explanation.

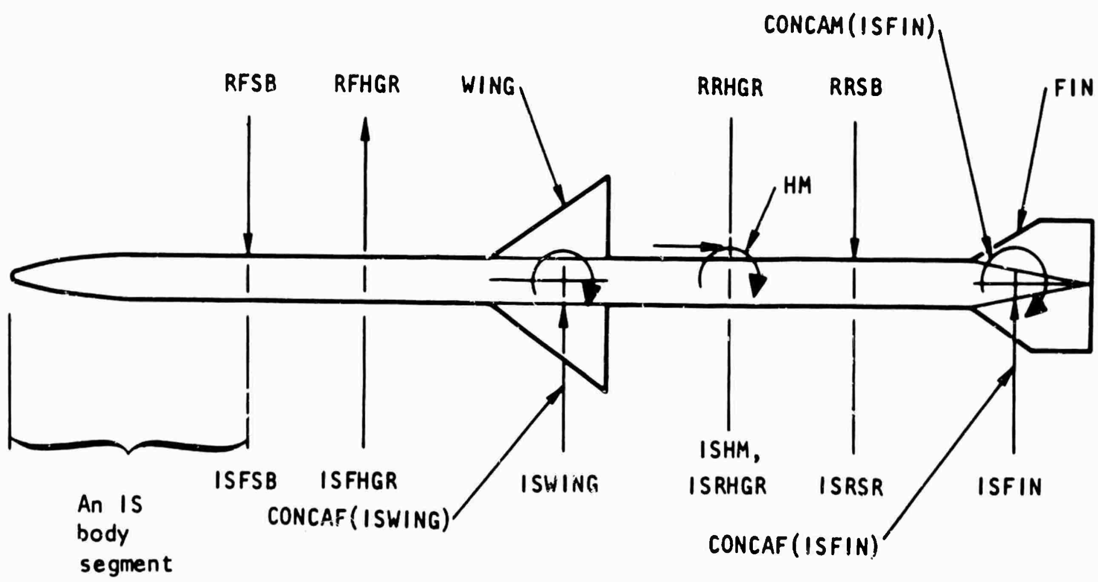


FIG. 8.

CONCLD first sets all concentrated loads to zero as a precaution against earlier values being stored there and inadvertently causing trouble. Following this, ISWING is tested (a zero value indicates no wing on the store, and its associated force and moment computations are omitted). If ISWING > 0, then loads due to a wing are computed

$$F_{wing} = C_{L_{\alpha,wing}} \cdot \alpha \cdot S \cdot q$$

$$M_{wing} = C_{m_{\alpha,wing}} \cdot \alpha \cdot S \cdot q \cdot \bar{c}$$

where

$$q = 1/2\ \rho\ V^2 \quad ,$$

the dynamic pressure.

If ISFIN > 0, the same is done for the fin

$$F_{fin} = C_{L_{\alpha,fin}} \cdot \alpha \cdot S \cdot q$$

$$M_{fin} = C_{m_{\alpha,fin}} \cdot \alpha \cdot S \cdot q \cdot \bar{c}$$

These aerodynamic forces and moments, considered for purposes of body loading as being concentrated, are stored as FORTRAN variables CONCAF and CONCAM, with appropriate subscripts to associate them with wing and fin stations. The locations of these concentrated aerodynamic loads (which themselves influence judgment in segmenting the body) may be chosen because available aerodynamic data are referenced to a certain point such as the surface quarter chord or perhaps a hinge line. At any rate, a pressure distributed over an aerodynamic surface can always be represented as a concentrated force and moment at an arbitrary point, as long as one's purpose will allow. Next, hanger loads are stored in locations indexed to associate them with the proper hanger station. Using FORTRAN symbols,

```
CONCHL(ISFSB) = RFSB

CONCHL(ISRSB) = RRSB
```

CONCHL(ISFHGR) = RFHGR

CONCHL(ISRHGR) = RRHGR

CONCHM(ISHM) = HM

Concentrated loads associated with IS indices which are zero or less are not computed (are left at their initial zero values).

As CONCLD now stands, concentrated hanger loads arising from different hanger components cannot be collocated at one body station. The same is true for concentrated aerodynamic loads. That is, for one IS subscript, there can be only one of each kind of concentrated load--CONCHL(IS), CONCHM(IS), CONCAF(IS), and CONCAM(IS). There can be one of each kind of concentrated load (four in all) sharing an IS subscript. If it happens, for example, that a store comes along that does have a lug and a pair of sway braces sharing the same body station, it is suggested that the user "invent" a vanishingly short IS segment to separate the collocated hanger components.

LISTING OF CONCLD

A FORTRAN IV or V listing of CONCLD follows. The simplicity of the subroutine obviates the need for a flow chart, and access into and return from the subroutine should be fairly evident from comparisons between this listing and MAIN's.

```
      SUBROUTINE CONCLD (RFHGR,RRHGR,RFSB,RRSB,HM,ALPHA)
      DIMENSION A(25),B(25),N(25),NOPT(25),CONCAF(25),CONCAM(25)
     1,X(41,25),DELCP(41,25),D(41,25),CONCHL(25),CONCHM(25),Z17(41,25)
     2,AERO(41,25),XISECT(41,25),Z18(25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      COMMON Z1,CORRI,Z2,Z3,Z4,Z5,Z6,HF,HD,HR,BHANGR,CBAR,S,RHO
     1,V,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,CONCAF,CONCAM,X
     2,DELCP,D,CONCHL,CONCHM,Z17,AERO,XISECT,XCG,IPLANE,IBATCH
     3,Z18,RALPHA
     4,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA,
     5 FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     6,ISHM,RAD
      DO 1  IS = 1, ISEGS
      CONCHL(IS) = 0.0
      CONCHM(IS) = 0.0
      CONCAF(IS) = 0.0
    1 CONCAM(IS) = 0.0
```

```
      IF (ISWING .EQ. 0) GO TO 2
      CONCAF(ISWING) = WNGCLA(IPLANE) * ALPHA * S * Q
      CONCAM(ISWING) = WNGCMA(IPLANE) * ALPHA * S * Q * CBAR
    2 CONTINUE
      IF (ISFIN .EQ. 0) GO TO 3
      CONCAF(ISFIN) = FINCLA(IPLANE) * ALPHA * S * Q
      CONCAM(ISFIN) = FINCMA(IPLANE) * ALPHA * S * Q * CBAR
    3 CONTINUE
      IF (ISFSB .GT. 0) CONCHL(ISFSB) = RFSB
      IF (ISRSB .GT. 0) CONCHL(ISRSB) = RRSB
      IF (ISFHGR .GT. 0) CONCHL(ISFHGR) = RFHGR
      IF (ISRHGR .GT. 0) CONCHL(ISRHGR) = RRHGR
      IF (ISHM .GT. 0) CONCHM(ISHM) = HM
      RETURN
      END
```

SUBROUTINE AIRLOD

AIRLOD adjusts aerodynamic loads distributed longitudinally along a store to match gross aerodynamic lift and moment. Adjustments are similar to those done in WEIGHT, though AIRLOD operates on vertical and lateral loads separately. Adjusted force distributions are listed and plotted, and are made available for subsequent computations. The need to make adjustments on aerodynamic load distributions arises from the fact that hanger loads are computed using gross aerodynamic coefficients, whereas distributed loads are integrated into shear and moment diagrams. Differences between summed distributed and gross air loads would result in an imbalance of shears and moments.

ENTRY

Entry into AIRLOD is made from MAIN through the FORTRAN subroutine call: CALL AIRLOD (CL, CM, ALPHA, AERO). The first three arguments are not in COMMON with similarly named variables in MAIN, so CALL AIRLOD (CY, CN, BETA, AERO) may be used. In this manner, forces and moments in the store's vertical (symmetry) plane and lateral plane are treated separately, although by the same subroutine. In either case, the first argument is a normal force coefficient, the second is a moment coefficient, the third is a flow angle in the plane under consideration, and the fourth is an aerodynamic force distribution (a double-subscripted variable).

SYMBOLS AND UNITS FOR AIRLOD

Algebraic symbol	FORTRAN equivalent	Definition
$\bar{c}$	CBAR	Aerodynamic reference length (inches)
C_L	CL	Gross aerodynamic force coefficient (dimensionless)
C_m	CM	Gross aerodynamic moment coefficient (dimensionless)
ΔC_P	DELCP	Distributed aerodynamic pressure coefficient imbalance at opposite sides of a body station, double-subscripted (dimensionless)
D	D	Local diameter of store body (inches)
f_a	AERO	Distributed aerodynamic force along store body due to ΔCp, double-subscripted (lb/in)
$f_{a,aft}$	DELARL	Adjustment to distributed aerodynamic load aft of reference center (lb/in)
$f_{a,fore}$	DELAFL	Adjustment to distributed aerodynamic load forward of reference center (lb/in)
$F_{a,c}$	CONCAF	Concentrated aerodynamic force at the aft end of an IS segment due to a wing or a fin (lb)
q	Q	Dynamic pressure (lb/in^2)
S	S	Aerodynamic reference area (in^2)
x	X	Station along store longitudinal axis, double indexed (usually in inches)
x_{arc}	ARC	Aerodynamic reference center (inches)
Δx or h	H	Incremental x station, section thickness (inches)
	AF	Accumulated aerodynamic load (lb)
	AFC	Aerodynamic force coefficient computed from accumulated distributed and concentrated aerodynamic forces (dimensionless)

Algebraic symbol	FORTRAN equivalent	Definition
	ALERR	A specified error limit for imbalance of force and moment
	AMC	Aerodynamic moment coefficient computed from accumulated distributed and concentrated aerodynamic force (dimensionless)
	B_{IS}	Aft end of an IS body segment (inches)
	I	An index denoting a body station within a segment
	IPLANE	Loads are accumulated into shear and moment distributions one plane at a time. The index IPLANE denotes with which of the two planes (whose intersection determines the store's longitudinal axis) loads are to be associated. Usually, IPLANE = 1 denotes the vertical (symmetry) plane, and IPLANE = 2 denotes the lateral plane
	IS	An index denoting a segment
	ISEGS	Number of segments store is broken up into (a convenient choice determined by the location of some discontinuity)
α	ALPHA	Flow angle, could be angle of attack on sideslip (deg)
α_{ref}	RALPHA	Reference flow angle, or flow angle associated with input ΔC_p (deg)

EQUATIONS

Compatibility between distributed and gross aerodynamic coefficients require that

$$S \cdot q \cdot C_L = \sum_x f_a(x) \cdot h + \sum_{IS} F_{a,c}$$

$$S \cdot q \cdot \bar{c} \cdot C_m = \sum_x f_a(x) \cdot \left| x_{arc} - x \right| \cdot h + \sum_{IS} F_{a,c} \cdot \left| x_{arc} - B_{IS} \right|$$

where

$$f_a(x) = \Delta C_P(x) \cdot q \cdot D(x) \cdot \alpha/\alpha_{ref}$$

Note the crude manner in which surface pressure coefficients are used to estimate distributed aerodynamic body loads.

If the gross aerodynamic force does not balance with the accumulated distributed aerodynamic loads to within a specified error limit (ALERR), the distributed loads are corrected by

$$f_a(x)_{adjusted} = f_a(x)_{old} + f_a(x) \cdot \frac{\left(C_L - AFC\right)}{C_L}$$

where AFC is the current accumulated aerodynamic load put in coefficient form. Similarly, if

$$\left|\frac{AMC - C_m}{C_m}\right| > ALERR \quad ,$$

the distributed aerodynamic load is again adjusted so as to affect a moment balance, but without upsetting the force balance. Figure 9 depicts the positive sense of variables used.

$$f_{a,fore} = \frac{\left(AMC - C_m\right) \cdot S \cdot q \cdot \bar{c} \cdot 3}{(B - A) \cdot \left(x_{arc} - A\right)}$$

$$f_{a,aft} = \frac{\left(AMC - C_m\right) \cdot S \cdot q \cdot \bar{c} \cdot 3}{(B - A) \cdot \left(B - x_{arc}\right)}$$

Note that

$$\left(x_{arc} - A\right) \cdot \Delta f_{a,fore} = \left(B - x_{arc}\right) \cdot \Delta f_{a,aft}$$

so that the force balance is not upset by the moment adjustment. For all x stations ahead of the aerodynamic reference center,

$$f_a(x)_{adjusted} = f_a(x) - \Delta f_{a,fore} \cdot \frac{x_{arc} - x}{x_{arc} - A}$$

and for all stations aft of the aerodynamic reference center,

$$f_a(x)_{adjusted} = f_a(x) + \Delta f_{a,aft} \cdot \frac{x - x_{arc}}{B - x_{arc}}$$

Note that concentrated airloads (due to wings or fins) are not altered when making moment adjustments. Convenience motivated this decision, plus the belief that airloads on wings and fins would be known better than body airload distributions.

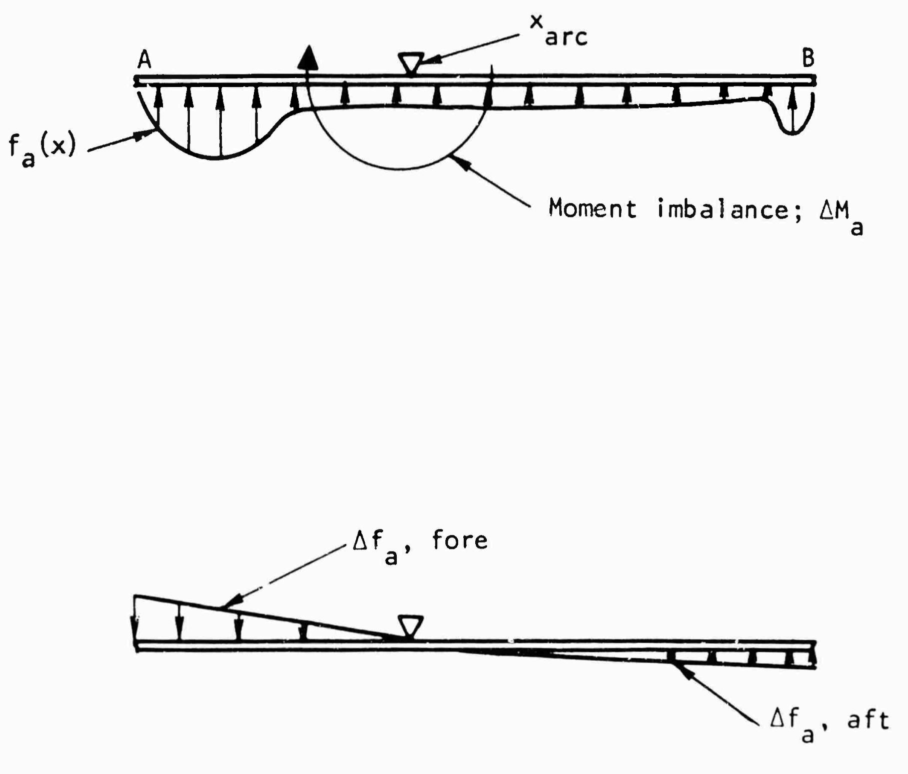
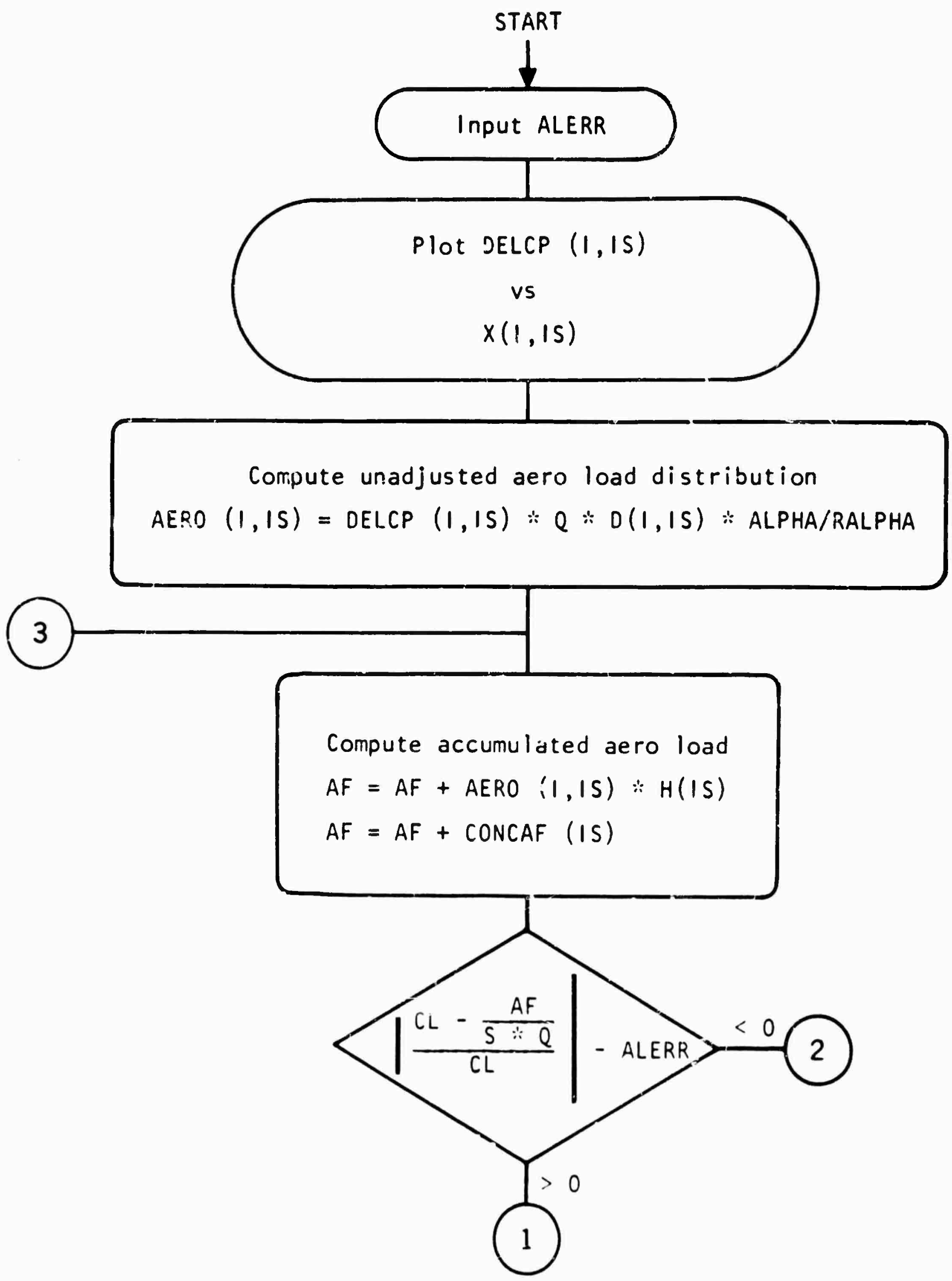
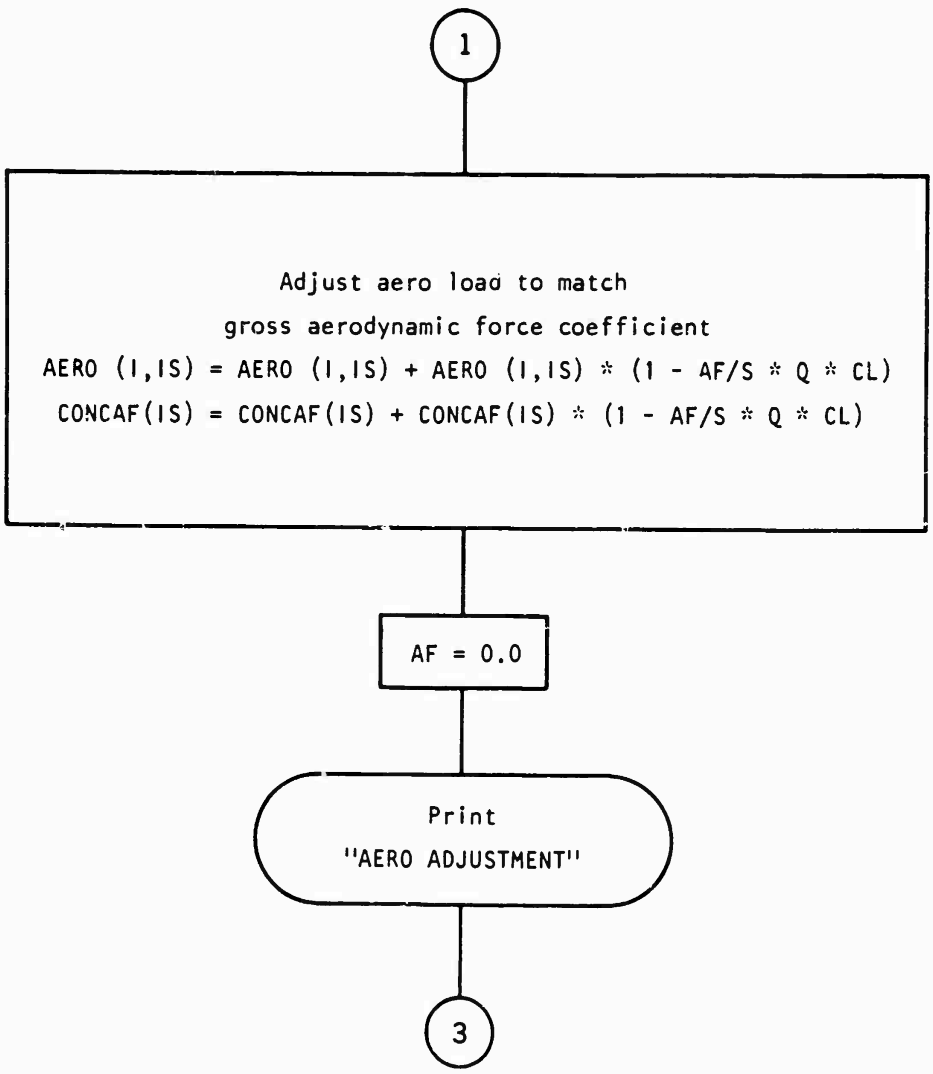
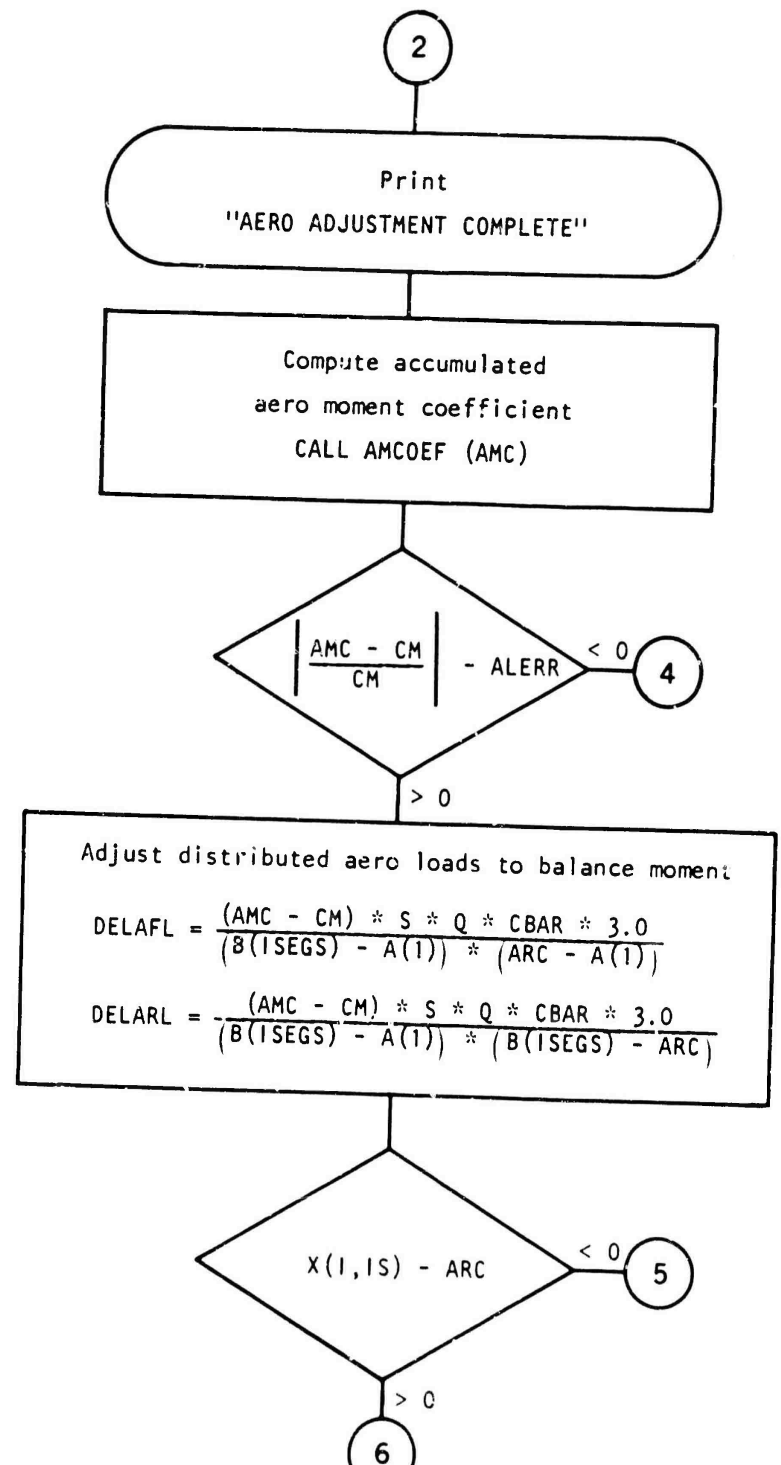


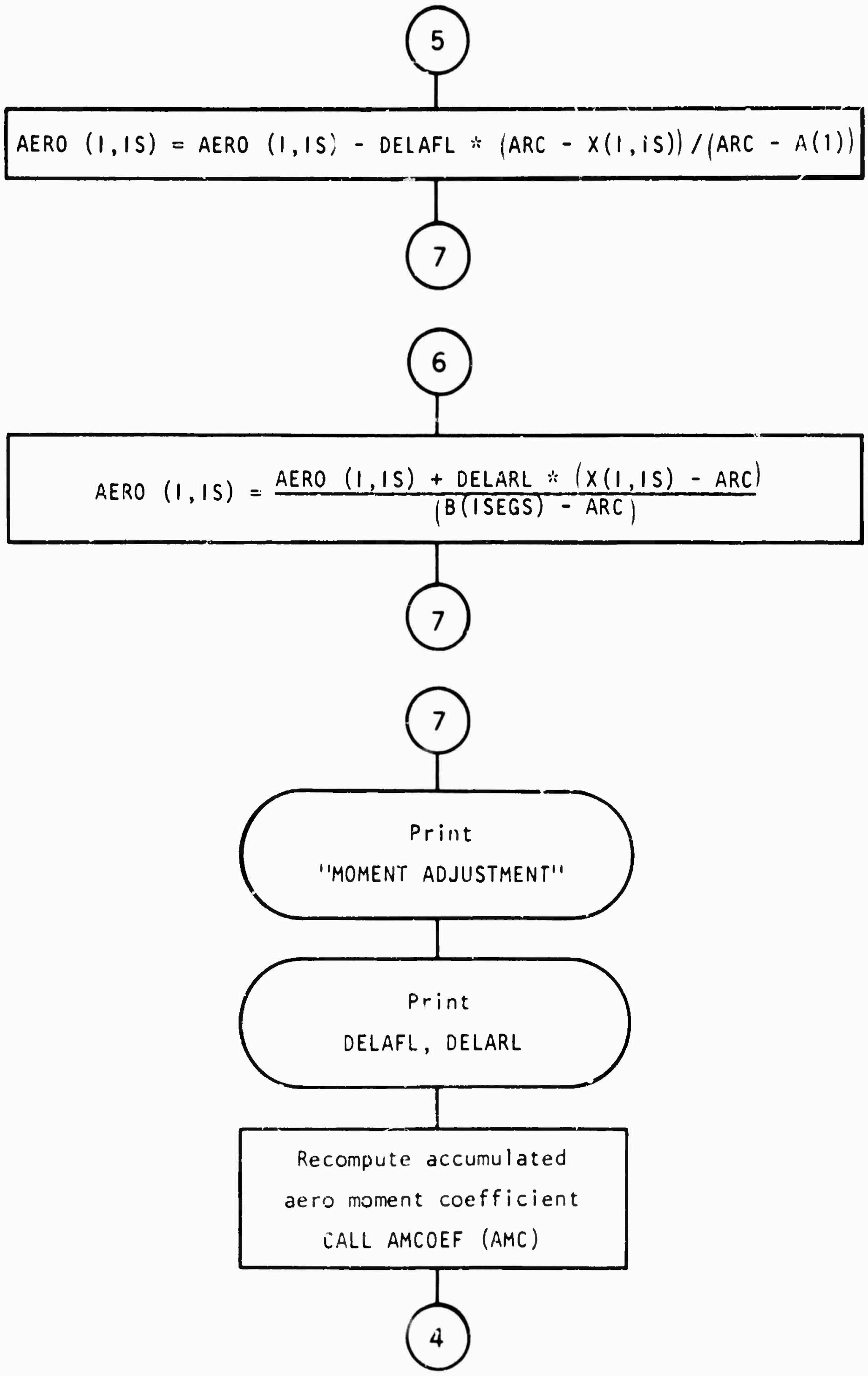
FIG. 9.

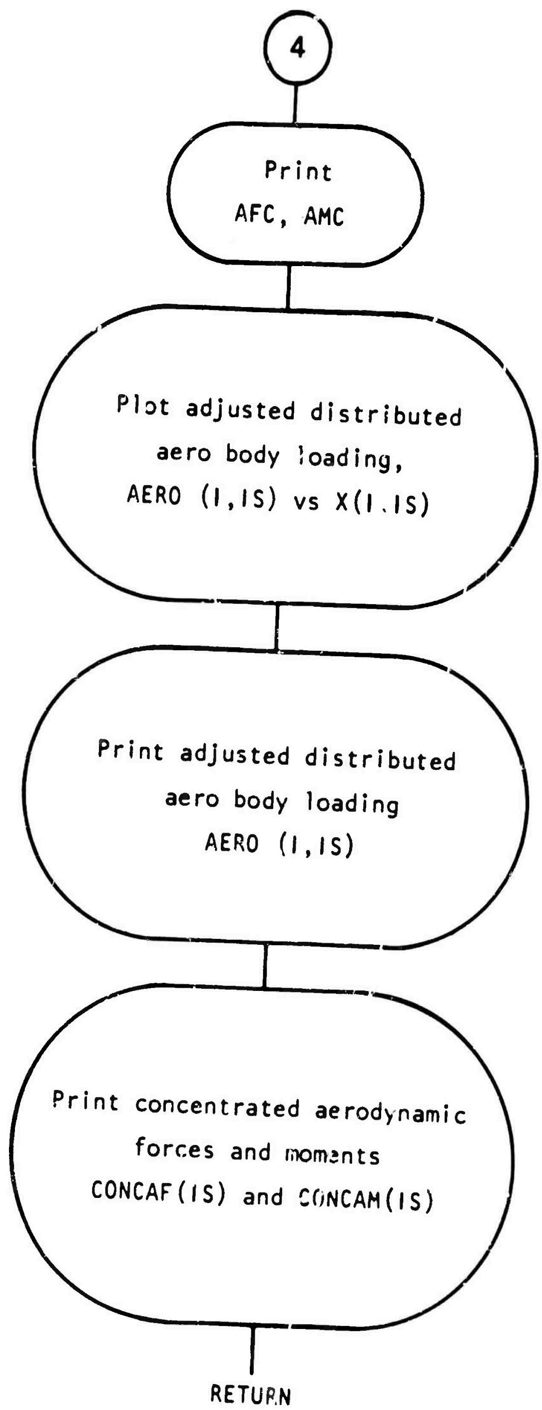
FLOW CHART


START
Input ALERR
Plot DELCP (I,IS)
vs
X(I,IS)
Compute unadjusted aero load distribution
AERO (I,IS) = DELCP (I,IS) * Q * D(I,IS) * ALPHA/RALPHA
3
Compute accumulated aero load
AF = AF + AERO (I,IS) * H(IS)
AF = AF + CONCAF (IS)
CL - AF / S * Q
CL
- ALERR
< 0
2
> 0
1


1
Adjust aero load to match
gross aerodynamic force coefficient
AERO (I,IS) = AERO (I,IS) + AERO (I,IS) * (1 - AF/S * Q * CL)
CONCAF(IS) = CONCAF(IS) + CONCAF(IS) * (1 - AF/S * Q * CL)
AF = 0.0
Print
"AERO ADJUSTMENT"
3


2
Print
"AERO ADJUSTMENT COMPLETE"
Compute accumulated
aero moment coefficient
CALL AMCOEF (AMC)
|(AMC - CM)/CM| - ALERR
< 0
4
> 0
Adjust distributed aero loads to balance moment
DELAFL = (AMC - CM) * S * Q * CBAR * 3.0 / ((B(ISEGS) - A(1)) * (ARC - A(1)))
DELARL = - (AMC - CM) * S * Q * CBAR * 3.0 / ((B(ISEGS) - A(1)) * (B(ISEGS) - ARC))
X(I,IS) - ARC
< 0
5
> 0
6


5
AERO (I,IS) = AERO (I,IS) - DELAFL * (ARC - X(I,IS))/(ARC - A(1))
7
6
AERO (I,IS) = AERO (I,IS) + DELARL * (X(I,IS) - ARC) / (B(ISEGS) - ARC)
7
7
Print
"MOMENT ADJUSTMENT"
Print
DELAFL, DELARL
Recompute accumulated
aero moment coefficient
CALL AMCOEF (AMC)
4


4
Print
AFC, AMC
Plot adjusted distributed
aero body loading,
AERO (I,IS) vs X(I,IS)
Print adjusted distributed
aero body loading
AERO (I,IS)
Print concentrated aerodynamic
forces and moments
CONCAF(IS) and CONCAM(IS)
RETURN

LISTING OF AIRLOD

A FORTRAN IV or V listing of AIRLOD follows. Further discussion of input data and output results will be deferred to the Appendix.

```
      SUBROUTINE AIRLOD (CL,CM,ALPHA,AERO)
C     AERO LOAD COMPATIBILIZER AND GENERATOR PROGRAM NO. 10904
      DIMENSION A(25),B(25),N(25),NOPT(25),CONCAF(25),CONCAM(25)
     1,X(41,25),DELCP(41,25),D(41,25),Z15(25),Z16(25),Z17(41,25)
     2,AERO(41,25),XISECT(41,25),H(25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      DIMENSION DUMYX(41),DUMYY(41)
      COMMON Z1,CORRI,D2THE,D2PSI,GX,GY,GZ,HF,HD,HR,BHANGR,CBAR,S,RHO,V
     1,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,CONCAF,CONCAM
     2,X,DELCP,D,Z15,Z16,Z17,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      COMMON XL,XR,DX,DY,NRT,MRT,ILABL,JLABL,NX,NY,MRKPT,LIN,
     1 LINX1,LINX2,LINY1,LINY2,IXL,IXR,IYB,IYT
  102 FORMAT (16H AERO ADJUSTMENT)
  103 FORMAT (25H AERO ADJUSTMENT COMPLETE)
  104 FORMAT (18H MOMENT ADJUSTMENT)
  105 FORMAT (10H DELAFL = ,E15.8)
  106 FORMAT (10H DELARL = ,E15.8)
    1 FORMAT (6E12.8)
    2 FORMAT (12I6)
   31 FORMAT (32H DISTRIBUTED AERO LOADS FOR SEG ,I2)
   32 FORMAT (1H ,6E12.5)
   34 FORMAT (37H CONCENTRATED AERO FORCES AND MOMENTS)
   35 FORMAT (1H ,2E12.5)
   46 FORMAT (I6,36H AERO LOAD POINTS FELL OFF YOUR PLOT)
   44 FORMAT (37H ADJUSTED SUMMED AERO MOMENT COEFF = ,E16.8)
   43 FORMAT (36H ADJUSTED SUMMED AERO FORCE COEFF = ,E16.8)
   39 FORMAT (I6,31H DELTA C.P.S FELL OFF YOUR PLOT)
      READ (5,1) ALERR
C     DATA TO SET UP PLOTTER FOR UNADJUSTED DELTA PRESSURE COEFFICIENTS
      CALL SCALE (DELCP,YB,YT,DY,MRT,JLABL)
      CALL CAMRAV (9)
      CALL GRID1V (1,XL,XR,YB,YT,DX,DY,NRT,MRT,-ILABL,-JLABL,NX,-NY)
      CALL PRINTV (16,16H MISSILE STATION,495,0)
      CALL APRNTV (0,-13,39,39H UNADJUSTED DELTA PRESSURE COEFFICIENTS,
     1 0,760)
      BATCH = FLOAT (IBATCH)
      CALL PRINTV (5,5H CASE,700,1023)
      CALL LABLV (BATCH,796,1023,6,1,6)
      PLANE = FLOAT (IPLANE)
      CALL PRINTV (6,6H PLANE,700,1013)
      CALL LABLV (PLANE,796,1013,6,1,6)
      AF = 0.0
```

```
          DO 11   IS = 1, ISEGS
          NISP1 = N(IS) + 1
          NIS = N(IS)
C         PLOT UNADJUSTED DELTA PRESSURE COEFFICIENTS
          IERR = 0
          DO 38  I = 1, NISP1
          DUMYX(I) = X(I,IS)
          DUMYY(I) = DELCP(I,IS)
       38 CONTINUE
          CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
          WRITE (6,39) IERR
          IF (LIN) 40,40,41
       41 CONTINUE
          DO 42  I = 1, NIS
          LINX1 = NXV(DUMYX(I))
          LINX2 = NXV(DUMYX(I+1))
          LINY1 = NYV(DUMYY(I))
          LINY2 = NYV(DUMYY(I+1))
       42 CALL LINEV(LINX1,LINY1,LINX2,LINY2)
       40 CONTINUE
C         COMPUTE UNADJUSTED AERO LOAD DISTRIBUTION
          DO 17    I = 1,NISP1
       17 AERO(I,IS) = DELCP(I,IS)*Q*D(I,IS)*ALPHA/RALPHA
       11 CONTINUE
      135 CONTINUE
C         COMPUTE TOTAL AERO LOAD
          DO 36  IS = 1, ISEGS
          NISP1 = N(IS) + 1
          DO 18    I = 1, NISP1
       18 AF = AF + AERO(I,IS) * H(IS)
          AF = AF - ((AERO(1,IS) + AERO(NISP1,IS))*(H(IS)/2.0))
          AF = AF + CONCAF(IS)
       36 CONTINUE
C         TEST AERO LOAD
          AFC = AF/(S*Q)
          PCTCL = (CL - AFC)/CL
          ABSPCT = ABS (PCTCL)
          IF (ABSPCT - ALERR) 26,26,27
C         ADJUST AERO LOAD
       27 DO 20    IS = 1, ISEGS
          NISP1 = N(IS) + 1
          DO 21    I = 1, NISP1
       21 AERO(I,IS) = AERO(I,IS) + AERO(I,IS)*PCTCL
       20 CONCAF(IS) = CONCAF(IS) + CONCAF(IS)*PCTCL
          AF = 0.0
          WRITE (6,102)
          GO TO 135
       26 CONTINUE
          WRITE (6,103)
C         COMPUTE TOTAL AERO MOMENT
          CALL AMCOEF (AMC)
C         TEST AERO MOMENT
          PCTCM = (AMC - CM)/CM
          ABSPCT = ABS(PCTCM)
          IF (ABSPCT - ALERR) 28,28,29
C         REDISTRIBUTE AERO LOAD TO MATCH CORRECT MOMENT
       29 AMTERM = (AMC-CM)*S*Q*CBAR*3.0/(B(ISEGS)-A(1))
          DELAFL = AMTERM/(ARC-A(1))
```

```
      DELARL = AMTERM/(B(ISEGS)-ARC)
      DO 22   IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 22   I = 1, NISP1
      IF (X(I,IS) - ARC) 23,24,25
   23 AERO(I,IS) = AERO(I,IS) - DELAFL*((ARC-X(I,IS))/(ARC-A(1)))
   24 GO TO 22
   25 AERO(I,IS) = AERO(I,IS) + DELARL*((X(I,IS)-ARC)/(B(ISEGS)-ARC))
   22 CONTINUE
      WRITE (6,104)
      WRITE (6,105) DELAFL
      WRITE (6,106) DELARL
      CALL AMCOEF (AMC)
   28 CONTINUE
      WRITE (6,43) AFC
      WRITE (6,44) AMC
C     PLOT, PUNCH, AND PRINT AERO FORCES AND MOMENTS
C     DATA TO SET UP PLOTTER FOR DISTRIBUTED AERO LOADS
      CALL SCALE (AERO,YB,YT,DY,MRT,JLABL)
      CALL GRID1V (1,XL,XR,YB,YT,DX,DY,NRT,MRT,-ILABL,-JLABL,NX,-NY)
      CALL PRINTV (16,16H MISSILE STATION,495,0)
      CALL APRNTV (0,-13,45,45H DISTRIBUTED AERO LOAD, FORCE PER UNIT LE
     1NGTH,0,800)
      CALL PRINTV (26,26H AERO FORCE COEFFICIENT = ,700,1023)
      CALL LABLV (CL,909,1023,7,1,1)
      CALL PRINTV (26,26H AERO MOMENT COEFFICIENT= ,700,1013)
      CALL LABLV (CM,909,1013,7,1,1)
      CALL PRINTV (25,25H AERO REFERENCE CENTER = ,700,1003)
      CALL LABLV (ARC,909,1003,7,1,4)
      DO 33   IS = 1, ISEGS
      NISP1 = N(IS) + 1
      IERR = 0
      DO 45   I = 1, NISP1
      DUMYX(I) = X(I,IS)
   45 DUMYY(I) = AERO(I,IS)
      CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      WRITE (6,46) IERR
      IF (LIN) 47,47,48
   48 CONTINUE
      NIS = N(IS)
      DO 49   I = 1, NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
   49 CALL LINEV(LINX1,LINY1,LINX2,LINY2)
   47 CONTINUE
      WRITE (6,31) IS
      WRITE (6,32) (AERO(I,IS), I = 1, NISP1)
   33 CONTINUE
      WRITE (6,34)
      WRITE (6,35) (CONCAF(IS),CONCAM(IS), IS = 1, ISEGS)
      RETURN
      END
```

INPUT DATA

ALERR, a specified error limit for imbalance of forces and moments, is the only input required by AIRLOD. All other required data are provided by MAIN either through subroutine arguments or COMMON. Note, however, that CL, CM, CY, CN, and ALPHA are not in COMMON between MAIN and AIRLOD. Force and moment coefficients and flow angles are passed between these two program segments only through subroutine arguments. For this reason, the same subroutine may be used to adjust side force and yawing moment as well as lift and pitching moment.

OUTPUT DATA

Subroutine AIRLOD produces plotted and printed output. Examples of these outputs are in Appendixes B and C, and are described very briefly therein. Following is a tabulation of output generated by one pass through the subroutine, in the order generated.

Plotted Output

1. DELCP(I,IS) versus X(I,IS)

2. AERO(I,IS) versus X(I,IS)

Printed Output

1. A comment on the number of DELCP's falling off the current plot. This is an obsolete output, but was left in for possible debug purposes.

2. A comment "AERO ADJUSTMENT" each time a force adjustment is made.

3. A comment "AERO ADJUSTMENT COMPLETE" when such is the case.

4. A comment "MOMENT ADJUSTMENT" when a moment adjustment is made.

5. Values of adjustments applied forward and aft of the aerodynamic reference center for moment balance, DELAFL and DELARL.

6. Adjusted summed force coefficient, AFC.

7. Adjusted summed moment coefficient, AMC.

8. A comment on the number of AERO values falling off the current adjusted aerodynamic body load plot.

9. Distributed aero loads, along with a label denoting their body segment location, AERO(I,IS).

10. Concentrated aero forces and moments, CONCAF(IS) and CONCAM(IS).

SUBROUTINE AMCOEF

AMCOEF works directly for subroutine AIRLOD and probably should have been discussed simultaneously with that subroutine. It is difficult to justify AMCOEF as a subroutine, although it seemed convenient to make it so at the time. AMCOEF accumulates distributed aerodynamic body loads and concentrated aerodynamic forces and moments into an aerodynamic moment about the reference center. This accumulated moment is put in coefficient form and returned to AIRLOD.

ENTRY

Entry into AMCOEF is made from AIRLOD through the FORTRAN subroutine call: CALL AMCOEF (AMC). The single argument is the computed aerodynamic moment coefficient. Other data interchanges are made through COMMON.

SYMBOLS AND UNITS

Algebraic symbol	FORTRAN equivalent	Definition
$\bar{c}$	CBAR	Aerodynamic reference length (inches)
C_{am}	AMC	Accumulated aerodynamic moment in coefficient form
f_a	AERO(I,IS)	Distributed aerodynamic body force (lb/in)
f_c	CONCAF(IS)	Concentrated aerodynamic force (lb)
h	H(IS)	Thickness of a body section, or incremental body station (inches)
is	IS	An index denoting an IS body segment
M_a	AM	Accumulated aerodynamic moment (lb-in)

Algebraic symbol	FORTRAN equivalent	Definition
m_o	CONCAM(IS)	Concentrated aerodynamic moment (lb-in)
q	Q	Dynamic pressure (lb/in^2)
S	S	Aerodynamic reference area (in^2)
x	X(I,IS)	Body station (inches)
x_{ref}	ARC	Aerodynamic reference center (inches)
	N(IS)	Number of sections within an IS segment

EQUATIONS

Figure 10 helps to illustrate AMCOEF's function.

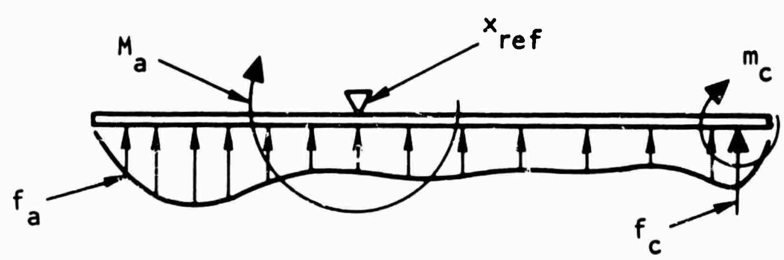


FIG. 10.

Effects of the distributed aerodynamic body loading and any concentrated forces and moments are accumulated and the result is set equal to M_a, a moment about the reference center

$$M_a = \sum_x f_a(x) \cdot |x_{ref} - x| \cdot h$$

$$+ \sum_{is} f_{c,is} \cdot |x_{ref} - x| + \sum_{is} m_{c,is}$$

M_a is put in coefficient form, as follows

$$C_{am} = \frac{M_a}{S \cdot q \cdot \bar{c}}$$

LISTING OF AMCOEF

A FORTRAN IV or V listing of AMCOEF follows. The simplicity of the subroutine obviates the need for a flow chart, and access into and return from the subroutine should be evident from comparisons between this listing and AIRLOD's.

```
      SUBROUTINE  AMCOEF (AMC)
      DIMENSION A(25),B(25),N(25),NOPT(25),CONCAF(25),CONCAM(25)
     1,X(41,25),DELCP(41,25),D(41,25),Z15(25),Z16(25),Z17(41,25)
     2,AERO(41,25),XISECT(41,25),H(25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      COMMON Z1,CORRI,D2THE,D2PSI,GX,GY,GZ,HF,HD,HR,BHANGR,CBAR,S,RHO
     1,V,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,CONCAF,CONCAM,X
     2,DELCP,D,Z15,Z16,Z17,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      AM = 0.0
      DO 37  IS = 1, ISEGS
      NISP1 = N(IS) + 1
      DO 19   I = 1, NISP1
   19 AM = AM + AERO(I,IS)*H(IS)*(ARC - X(I,IS))
      AM=AM-((AERO(1,IS)*(ARC-X(1,IS))+AERO(NISP1,IS)*(ARC-X(NISP1,IS)
     1))  *H(IS)/2.0)
      AM = AM + (CONCAF(IS)*(ARC-X(NISP1,IS))) + CONCAM(IS)
   37 CONTINUE
      AMC = AM/(S*Q*CBAR)
      RETURN
      END
```

SUBROUTINE SMDIAG

SMDIAG performs the following functions:

1. Accumulates distributed aerodynamic and inertia loads, along with concentrated aerodynamic and hanger loads imposed upon the store's body.

2. Integrates these loads once along the body length to produce a shear distribution, and twice to produce a moment distribution.

3. Plots these data as shear and moment diagrams.

ENTRY

Entry into SMDIAG is made from MAIN through the FORTRAN subroutine call: CALL SMDIAG (AA, G, S, XM). This subroutine treats loads in one plane at a time. The first argument in the CALL sequence is an angular acceleration (rad/sec^2). The second argument, G, is a linear acceleration (in gravity units). These first two are furnished to the subroutine as input data. The last two arguments, S and XM, are shear and moment distributions and are the output results of the subroutine. Units on these last two are lb and lb-in, respectively, and both are double-subscripted.

SYMBOLS AND UNITS FOR SMDIAG

Algebraic symbol	FORTRAN equivalent	Definition
A(x)	AERO(I,IS)	Distributed aerodynamic load on body (lb/in)
a/g	G	Linear acceleration imposed upon the store in the plane being considered (gravity units)
F(x)	F(I,IS)	Distributed load on body of store (lb)
$F_{ca,is}$	CONCAF(IS)	Concentrated aerodynamic force (lb)
$F_{ch,is}$	CONCHL(IS)	Concentrated hanger load (lb)
$I_{i,is}$	XISECT(I,IS)	Section inertias, distributed inertias (lb-in^2)
M(x)	XM(I,IS)	Moment distribution (lb-in)

Algebraic symbol	FORTRAN equivalent	Definition
$M_{ca,is}$	CONCAM(IS)	Concentrated aerodynamic moment (lb-in)
$M_{ch,is}$	CONCHM(IS)	Concentrated hanger moment (lb-in)
$S(x)$	S(I,IS)	Shear distribution (lb)
$w(x)$	W(I,IS)	Running weight, weight distribution along body longitudinal axis (lb/in)
x	X(I,IS)	Body station of store (inches)
x_{cg}	XCG	Center of gravity station (inches)
	I	An index denoting a body station
	IS	An index denoting an IS body segment
	IBATCH	A label identifying output data
	IPLANE	A label identifying the plane being treated
	ISEGS	Number of segments store body is divided into
	N(IS)	Number of sections within an IS segment
$\ddot{\alpha}$	AA	Angular acceleration imposed upon the store in the plane being considered (rad/sec^2)

EQUATIONS

SMDIAG first accumulates distributed loads imposed upon the store body

$$F(x) = -w(x) \cdot \frac{a}{g} + w(x) \cdot \left| x - x_{cg} \right| \cdot \frac{\ddot{\alpha}}{386.088} + A(x)$$

Integration produces distributed shear

$$S(x) = \int^{x} F(x)\, dx + F_{ca,is} + F_{ch,is}$$

Here, the concentrated loads are added into the shear distribution wherever they occur. Shear is integrated to produce distributed moment

$$M(x) = \int^{x} S(x)\,dx - \frac{I_{i,is} \cdot \ddot{\alpha}}{386.088}$$

$$+ M_{ca,is} + M_{ch,is}$$

Again, concentrated moments are added into the moment distribution wherever they occur. Also, effects of angular acceleration acting upon section inertias are included at each station. A free body diagram (Fig. 11) will illustrate the positive sense of these loads.

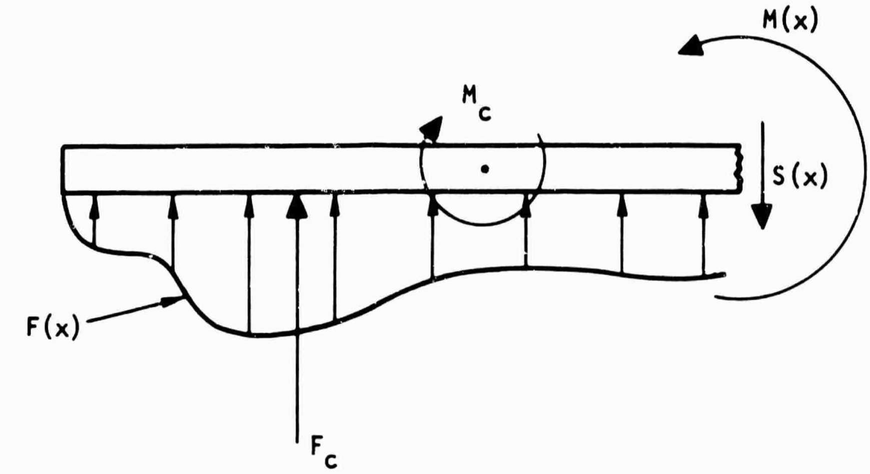


FIG. 11.

Reference 7 (sec. 3-2) or any other elementary strength-of-materials text discusses the methods used herein.

Subroutine PINTEG, to be discussed immediately following the present subroutine, performs both integrations.

FLOW CHART

START

Accumulate distributed loads

F(I,IS) = -W(I,IS) * G + W(I,IS) * (X(I,IS) - XCG) * AA/386.088
+ AERO (I,IS)

at all body stations

Plot distributed loads
F(I,IS) vs X(I,IS)

Print a comment on the number of
points falling off of distributed loads plot

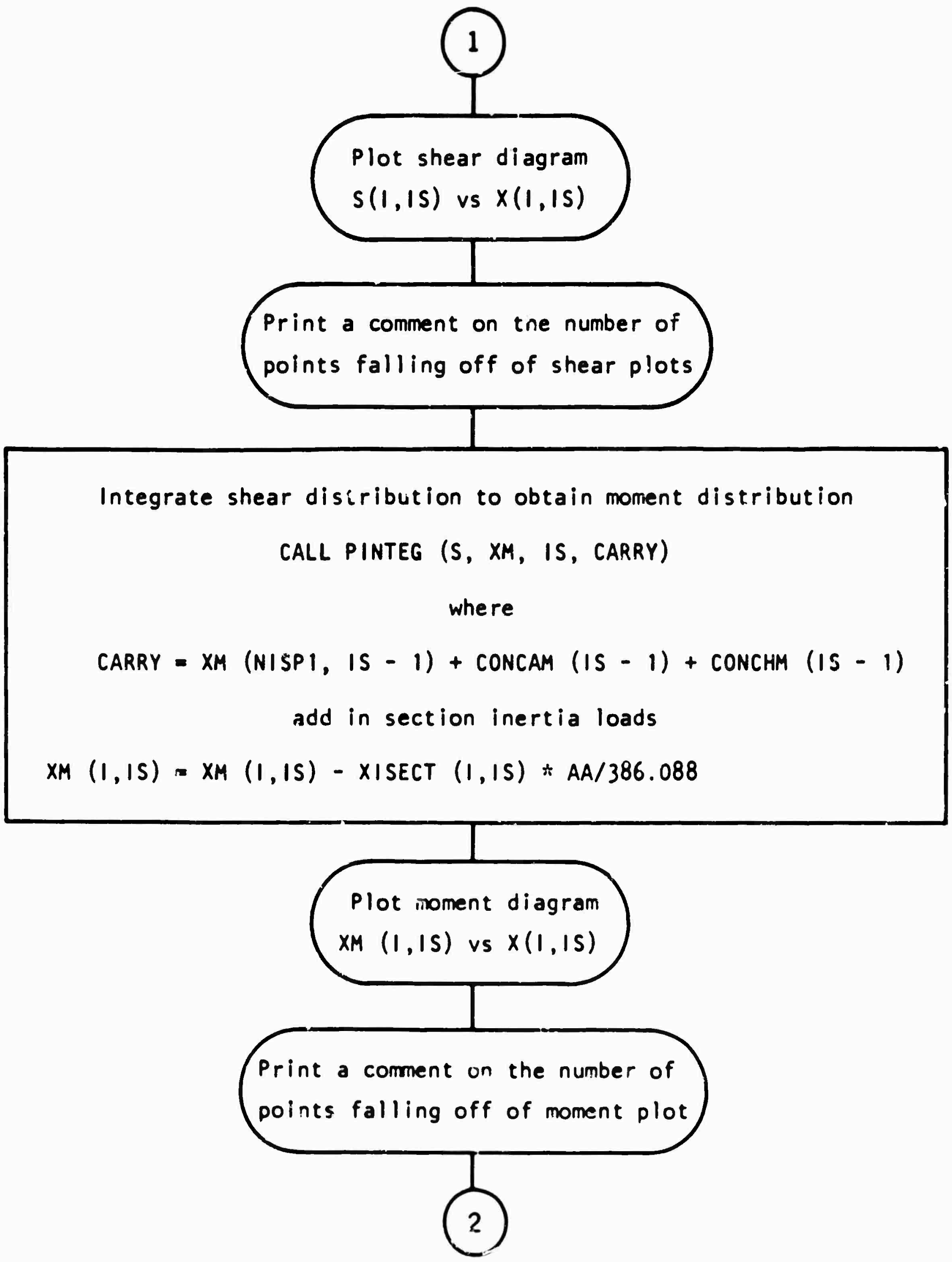
Integrate distributed loads to obtain shear distribution

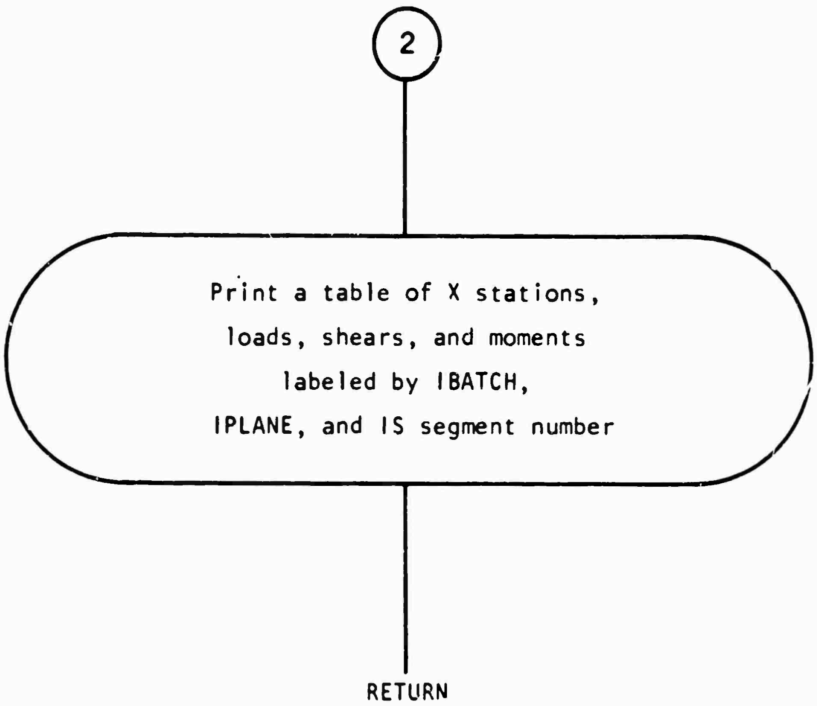
CALL PINTEG (F, S, IS, CARRY)

where

CARRY = S(NIPSP1, IS - 1) + CONCAF (IS - 1) + CONCHL (IS - 1)

1


1
Plot shear diagram
S(I,IS) vs X(I,IS)
Print a comment on tne number of
points falling off of shear plots
Integrate shear distribution to obtain moment distribution
CALL PINTEG (S, XM, IS, CARRY)
where
CARRY = XM (NISP1, IS - 1) + CONCAM (IS - 1) + CONCHM (IS - 1)
add in section inertia loads
XM (I,IS) = XM (I,IS) - XISECT (I,IS) * AA/386.088
Plot moment diagram
XM (I,IS) vs X(I,IS)
Print a comment on the number of
points falling off of moment plot
2



LISTING OF SMDIAG

The following listing of SMDIAG is in FORTRAN IV or V.

```
      SUBROUTINE SMDIAG (AA,B,S,XM)
C     LOAD, SHEAR, ANDMOMENT DIAGRAM ' PROGRAM NO. 10905
C     INTEGRATES LOADS TO GIVE SHEAR, INTEGRATES SHEAR TO GIVE MOMENT
      DIMENSION F(41,25),S(41,25),XM(41,25)
      DIMENSION A(25),B(25),N(25),NOPT(25),CONCAF(25),CONCAM(25)
     1,X(41,25),DELCP(41,25),D(41,25),CONCHL(25),CONCHM(25),W(41,25)
     2,AERO(41,25),XISECT(41,25),H(25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      DIMENSION DUMYX(41),DUMYY(41)
      COMMON Z1,CORRI,Z2,Z3,Z4,Z5,Z6,HF,HD,HR,BHANGR,CBAR,Z7,RHO,V
     1,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,CONCAF,CONCAM,X
     2,DELCP,D,CONCHL,CONCHM,W,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      COMMON XL,XR,DX,DY,NRT,MRT,ILABL,JLABL,NX,NY,MRKPT,LIN,
     1 LINX1,LINX2,LINY1,LINY2,IXL,IXR,IYB,IYT
    1 FORMAT (6E12.8)
    2 FORMAT (12I6)
    5 FORMAT (I6,31H LOAD POINTS FELL OFF YOUR PLOT)
    6 FORMAT (I6,32H SHEAR POINTS FELL OFF YOUR PLOT)
    7 FORMAT (I6,33H MOMENT POINTS FELL OFF YOUR PLOT)
    9 FORMAT (8H SEGMENT, I6)
   10 FORMAT (1P4E18.8)
```

```
   11 FORMAT(72H     STATION                    LOAD                    SHEAR
     1     MOMENT      )
   12 FORMAT (5H CASE,I6)
   13 FORMAT (6H PLANE,I6)
   14 FORMAT (1H0)
C     DISTRIBUTED LOADS ACCUMULATION
      DO 101  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 101  I = 1, NISP1
      F(I,IS) = -W(I,IS)*G+W(I,IS)*(X(I,IS)-XCG)*AA/386.088+AERO(I,IS)
  101 CONTINUE
C     DATA TO SET UP PLOTTER FOR CUMULATIVE LOAD PLOT
      CALL SCALE (F,YB,YT,DY,MRT,JLABL)
      CALL GRID1V (1,XL,XR,YB,YT,DX,DY,NRT,MRT,ILABL,JLABL,NX,-NY)
      CALL PRINTV (16,16H MISSILE STATION,495,0)
      CALL APRNTV (0,-13,17,17H DISTRIBUTED LOAD,0,640)
      LINX2 = NXV(A(1))
      LINY2 = NYV(0,0)
      DO 106  IS = 1, ISEGS
      NISP1 = N(IS) + 1
      IERR = 0
      DO 107  I = 1, NISP1
      DUMYY(I) = F(I,IS)
  107 DUMYX(I) = X(I,IS)
      CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      WRITE (6,5) IERR
      IF (LIN) 103,103,104
  104 NIS = N(IS)
      LINX1 = NXV(DUMYX(1))
      LINY1 = NYV(DUMYY(1))
      CALL LINEV (LINX2,LINY2,LINX1,LINY1)
      DO 105  I = 1, NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
  105 CALL LINEV (LINX1,LINY1,LINX2,LINY2)
  103 CONTINUE
  106 CONTINUE
C     INTEGRATE DISTRIBUTED LOADS TO OBTAIN SHEAR DISTRIBUTION
      DO 1100  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 108  I = 1, NISP1
  108 DUMYX(I) = F(I,IS)
      CALL PINTEG (DUMYX,DUMYY,IS,CARRY)
      DO 109  I = 1, NISP1
  109 S(I,IS) = DUMYY(I)
      CARRY = S(NISP1,IS) + CONCAF(IS) + CONCML(IS)
 1100 CONTINUE
C     DATA TO SET UP PLOTTER FOR SHEAR ' MOMENT PLOT
      CALL SCALE (S,YB,YT,DY,MRT,JLABL)
      CALL SETMIV (24,0,529,0)
      CALL GRID1V(1,XL,XR,YB,YT,DX,DY,NRT,MRT,ILABL,JLABL,NX,-NY)
      CALL APRNTV (0,-12,6,6H SHEAR,0,840)
      CALL APRNTV (0,-12,7,7H MOMENT,0,300)
      CALL PRINTV (16,16H MISSILE STATION,495,0)
      BATCH = FLOAT(IBATCH)
      CALL PRINTV (5,5H CASE,700,1023)
      CALL LABLV (BATCH,706,1023,6,1,6)
      PLANE = FLOAT (IPLANE)
```

```
      CALL PRINTV (6,6H PLANE,700,1013)
      CALL LABLV (PLANE,796,1013,6,1,6)
      IXL = NXV(XL)
      IXR = 1023 - NXV(XR)
      IYB = NYV(YB)
      IYT = 1023 - NYV(YT)
      CALL XSCALV (XL,XR,IXL,IXR)
      CALL YSCALV (YB,YT,IYB,IYT)
      LINX2 = NXV(A(1))
      LINY2 = NYV(0.0)
      CARRY = 0.0
      DO 100  IS = 1, ISEGS
      NISP1 = N(IS) + 1
C     PLOT SHEAR
      IERR = 0
      DO 112  I = 1, NISP1
      DUMYY(I) = S(I,IS)
  112 DUMYX(I) = X(I,IS)
      CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      WRITE (6,6) IERR
      IF (LIN) 113,113,114
  114 NIS = N(IS)
      LINX1 = NXV(DUMYX(1))
      LINY1 = NYV(DUMYY(1))
      CALL LINEV(LINX2,LINY2,LINX1,LINY1)
      DO 115  I = 1, NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
  115 CALL LINEV(LINX1,LINY1,LINX2,LINY2)
  113 CONTINUE
  100 CONTINUE
C     INTEGRATE SHEAR TO OBTAIN MOMENT DISTRIBUTION
      DO 120  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 110  I = 1, NISP1
  110 DUMYX(I) = S(I,IS)
      CALL PINTEG (DUMYX,DUMYY,IS,CARRY)
      DO 111  I = 1, NISP1
  111 XM(I,IS) = DUMYY(I)
      DO 102  I = 1, NISP1
  102 XM(I,IS) = XM(I,IS) - XISECT(I,IS)*AA/386.088
      CARRY = XM(NISP1,IS) + CONCAM(IS) + CONCHM(IS)
  120 CONTINUE
      CALL SCALE (XM,YB,YT,DY,MRT,JLABL)
      CALL SETMIV (24,0,24,505)
      CALL GRID1V (2,XL,XR,YB,YT,DX,DY,NRT,MRT,ILABL,JLABL,NX,-NY)
      IXL = NXV(XL)
      IXR = 1023 - NXV(XR)
      IYB = NYV(Y
      IYT = 1023 - NYV(YT)
      CALL XSCALV (XL,XR,IXL,IXR)
      CALL YSCALV (YB,YT,IYB,IYT)
      LINX2 = NXV(A(1))
      LINY2 = NYV(0.0)
      CARRY = 0.0
      DO 11[illegible]5  IS = [illegible], ISEGS
      NISP1 = N(IS) + 1
C     PLOT MOMENT
```

```
      IERR = 0
      DO 116  I = 1, NISP1
      DUMYY(I) = XM(I,IS)
  116 DUMYX(I) = X(I,IS)
      CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      WRITE (6,7) IERR
      IF (LIN) 117,117,118
  118 NIS = N(IS)
      LINX1 = NXV(DUMYX(1))
      LINY1 = NYV(DUMYY(1))
      CALL LINEV(LINX2,LINY2,LINX1,LINY1)
      DO 119  I = 1, NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
  119 CALL LINEV (LINX1,LINY1,LINX2,LINY2)
  117 CONTINUE
      WRITE (6,14)
      WRITE (6,12) IBATCH
      WRITE (6,13) IPLANE
      WRITE (6,9) IS
      WRITE (6,11)
      WRITE (6,10) (X(I,IS), F(I,IS), S(I,IS), XM(I,IS), I = 1, NISP1)
 1115 CONTINUE
      WRITE (6,14)
      CALL SETMIV (24,0,24,24)
      RETURN
      END
```

INPUT DATA

Data are supplied to SMDIAG through subroutine arguments and COMMON. Note that the first two subroutine arguments, the angular and linear accelerations, were kept out of COMMON. As used in the present program, this subroutine is first called with symmetry plane accelerations as the first two arguments, and later with lateral accelerations--the results are shear and moment diagrams in the two perpendicular planes. Other variables come from COMMON, and are used as needed.

OUTPUT DATA

Subroutine SMDIAG produces plotted and printed output. Examples of these outputs are in Appendixes B and C. A tabulation of output generated by one pass through the subroutine is given below, in the order generated.

Plotted Output

1. F(I,IS) versus X(I,IS)

2. S(I,IS) versus X(I,IS)

   XM(I,IS) versus X(I,IS)

Printed Output

1. A comment on the number of points falling off the distributed loads plot.

2. A comment on the number of points falling off the shear diagram plot.

3. A comment on the number of points falling off the moment diagram plot.

4. IBATCH, a label identifying a data batch.

5. IPLANE, a label identifying which of two planes the following data pertains to.

6. IS, the body segment number pertaining to the following data.

7. A heading identifying the following data.

8. A tabulation of X(I,IS), F(I,IS), S(I,IS), XM(I,IS).

9. Items 4 through 8 are repeated in succession for each IS body segment.

SUBROUTINE PINTEG

PINTEG is a simple trapezoidal rule integration routine used by SMDIAG to integrate loads distributions in producing shear and moment diagrams. Entry is made through the FORTRAN subroutine call: CALL PINTEG (F, P, IS, CARRY). The first argument is the input distribution to be integrated, either distributed load or shear as used by the present program. Output shear or moment results of the integration are given through the second argument. IS is the body segment index being treated (the subroutine is called to integrate over body stations of one body segment at a time). CARRY is a carry-over load, a kind of "initial condition," which is to be imposed upon the first station in the body segment. As far as this subroutine is concerned, units are arbitrary.

SYMBOLS AND UNITS FOR PINTEG

Algebraic symbol	FORTRAN equivalent	Definition
C	CARRY	A carry-over value or initial condition to be added to the first station of the IS body segment
F_k	F(k)	A discrete representation of an input function to be integrated
h	H(IS)	Incremental body station, or section thickness
n	N(IS)	The number of stations within an IS segment
P_k	P(K)	A discrete representation of the results of integrating F_k

EQUATIONS

PINTEG represents the integral

$$P(x) = \int^{x} F(x)\, dx + C$$

by the trapezoidal algorithm

$$P_{k+1} = \left(F_{k+1} + F_k\right) \cdot \frac{h}{2} + P_k$$

A carry-over initial condition, C, is used as a starting value for the function

$$P_1 = C$$

Reference 8 (Chapter 6) is one of many good texts which might be consulted on this and other numerical integration schemes. Other numerical integrations could be used, and this one was made into a separate subroutine mainly to simplify adopting another. However, the advantages of simplicity, few restrictions, and self-starting make the trapezoidal algorithm ideal for the present purposes.

LISTING OF PINTEG

The following is listing of PINTEG. Simplicity obviates the need for a flow chart, and the routine has no input or output that has not already been discussed.

```
-I FOR  PINTEG,PINTEG
      SUBROUTINE PINTEG (F, P, IS, CARRY)
C     DISTRIBUTED LOADS INTEGRATION SUBROUTINE
      DIMENSION F(41),P(41)
      DIMENSION A(25),B(25),N(25),NOPT(25),Z13(25),Z14(25)
     1,X(41,25),DELCP(41,25),D(41,25),Z15(25),Z16(25),W(41,25)
     2,AERO(41,25),XISECT(41,25),H(25)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      COMMON Z1,CORRI,Z2,Z3,Z4,Z5,Z6,HF,HD,HR,BHANGR,CBAR,Z7,RHO,V
     1,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,Z13,Z14,X,DELCP,D
     2,Z15,Z16,W,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      NIS = N(IS)
      DO 10  I = 1,NIS
   10 P(I) = 0.0
      P(1) = CARRY
      DO 100  K = 1, NIS
  100 P(K+1) = (F(K+1) + F(K))*H(IS)/2.0  +  P(K)
      RETURN
      END
```

SUBROUTINE RSLTNT

Subroutine RSLTNT accepts component shear and moment distributions from MAIN and plots the magnitude of their resultant versus store body station. Entry into RSLTNT is made from MAIN through the FORTRAN subroutine call: CALL RSLTNT (CXS, CSM) where the two arguments are mutually perpendicular components of shear (CXS) and moment (CSM) in the form of double-subscripted, complex variables.

SYMBOLS AND UNITS FOR RSLTNT

Algebraic symbol	FORTRAN equivalent	Definition
$M_{cx}(x)$	CXM(I,IS)	A complex variable representing the two mutually perpendicular components of moment (lb-in)
$S_{cx}(x)$	CXS(I,IS)	A complex variable representing the two mutually perpendicular components of shear (lb)
	I	An index denoting body stations within a body segment
	IBATCH	An identifier for data batches
	IS	An index denoting IS body segments
	ISEGS	The number of segments a store body is divided into
	N(IS)	The number of body sections within a body segment
	XMMAX(I,IS)	Maximum values of moment at given body stations encountered so far in the present run of load conditions (lb-in)
	XSMAX(I,IS)	Maximum values of shear at given body stations encountered so far in the present run of load conditions (lb)
cx		A subscript denoting a complex variable
lat		A subscript denoting components in the store's lateral plane
res		A subscript denoting the magnitude of the resultant
sym		A subscript denoting components in the store's vertical or symmetry plane

EQUATIONS

Recall from the discussion of MAIN that shear and moment distribution along the store body in two mutually perpendicular planes are computed separately, and these component distributions are stored in a pair of double-subscripted complex variables. The symmetry plane shears and moments are stored in the real part, and the lateral plane shears and moments in the imaginary part.

$$S_{cx}(x) = S_{sym}(x) + iS_{lat}(x)$$

$$M_{cx}(x) = M_{sym}(x) + iM_{lat}(x)$$

$$i = \sqrt{-1}$$

These complex forms of shears and moments are presented to RSLTNT. Upon receipt of these variables, RSLTNT takes their complex absolute value.

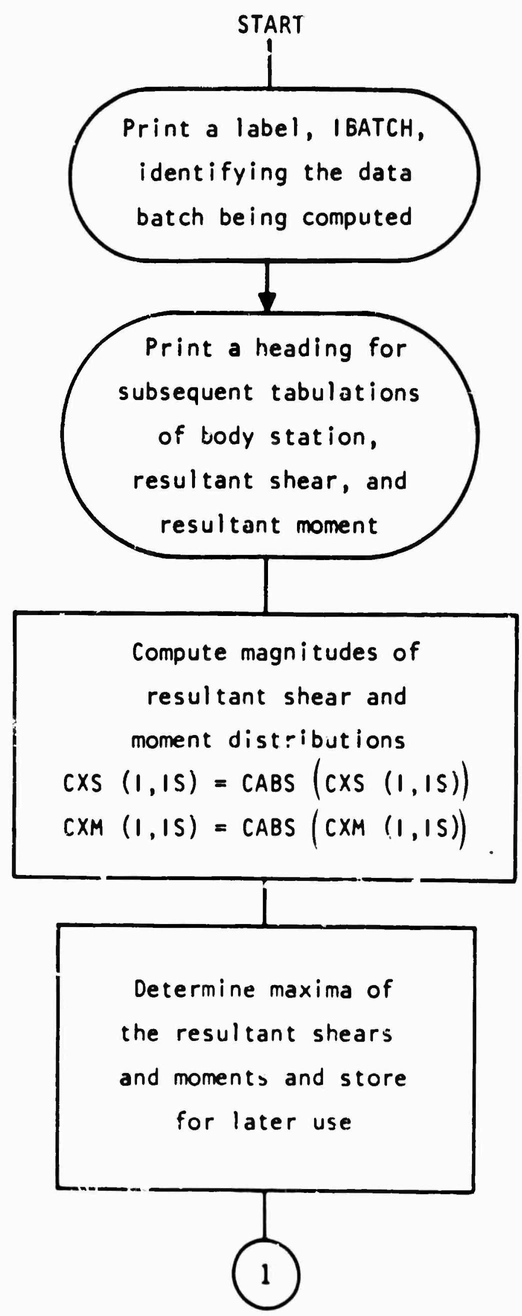
$$\left|S_{res}\right| = \sqrt{S_{sym}(x)^2 + S_{lat}(x)^2}$$

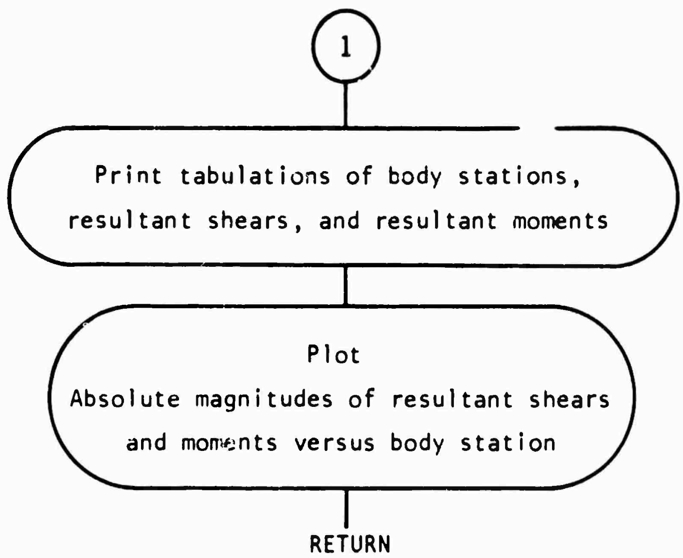
$$\left|M_{res}\right| = \sqrt{M_{sym}(x)^2 + M_{lat}(x)^2}$$

These latter absolute values of resultant shears and moments are plotted versus body station for each load condition imposed upon the store. For these values to sensibly represent resultant loads experienced by the store, load conditions (in terms of accelerations, airloads, etc.) must have been originally specified in terms of components in orthogonal reference axes. One should be warned of this, because non-orthogonal axis systems are not uncommon in aeronautical engineering.

After resultants have been computed, these resultants are compared with resultant shears and moments computed previously from other load conditions, and the largest of the current and previous shears and moments at each body station are kept for later use. These steps are performed at lines 35 and 36 in the RSLTNT subroutine listing. Subroutine ENVLOP is the recipient of these maximum values.

FLOW CHART


START
Print a label, IBATCH, identifying the data batch being computed
Print a heading for subsequent tabulations of body station, resultant shear, and resultant moment
Compute magnitudes of resultant shear and moment distributions
CXS (I,IS) = CABS (CXS (I,IS))
CXM (I,IS) = CABS (CXM (I,IS))
Determine maxima of the resultant shears and moments and store for later use
1



LISTING OF RSLTNT

Following is a FORTRAN IV or V listing of subroutine RSLTNT. It should be pointed out that the variable AERO(I,IS) is used as temporary address locations for CXS(I,IS) and CXM(I,IS) on different occasions. This does not imply any relationship between the variables; it was only done for convenience and memory space conservation.

```
      SUBROUTINE RSLTNT (CXS, CXM)
      COMPLEX CXS,CXM
      DIMENSION CXS(41,25),CXM(41,25)
      DIMENSION XSMAX(41,25),XMMAX(41,25)
      DIMENSION A(25),B(25),N(25),NOPT(25),Z13(25),Z14(25),X(41,25)
     1,DELCP(41,25),D(41,25),Z15(25),Z16(25),W(41,25),AERO(41,25)
     2,XISECT(41,25),H(25),DUMYX(41),DUMYY(41)
     3, WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
      COMMON Z1,CORRI,Z2,Z3,Z4,Z5,Z6,HF,HD,HR,BHANGR,CBAR,Z7,RHO,V
     1,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,Z13,Z14,X,DELCP,D
     2,Z15,Z16,W,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      COMMON XL,XR,DX,DY,NRT,MRT,ILABL,JLABL,NX,NY,MRKPT,LIN,
     1 LINX1,LINX2,LINY1,LINY2,IXL,IXR,IYB,IYT
      COMMON XSMAX,XMMAX
      COMMON CXS,CXM
C     FIND RESULTANT
    5 FORMAT (1P3E18.8)
    4 FORMAT (8H SEGMENT,I6)
    3 FORMAT (54H0   STATION             SHEAR                   MOMENT
    2 FORMAT (22H1RESULTANT LOADS, CASE,I6)
      WRITE (6,2) IBATCH
```

```
      DO 111  IS = 1, ISEGS
      WRITE (6,4) IS
      WRITE (6,3)
      NISP1 = N(IS) + 1
      DO 110  I = 1, NISP1
      CXS(I,IS) = CABS(CXS(I,IS))
      CXM(I,IS) = CABS(CXM(I,IS))
      DUMYX(I) = REAL(CXS(I,IS))
      DUMYY(I) = REAL(CXM(I,IS))
C     STORE MAXIMUM SHEAR AND MOMENT
      IF (ABS(DUMYX(I)) .GT. ABS(XSMAX(I,IS))) XSMAX(I,IS) = DUMYX(I)
      IF(ABS(DUMYY(I)) .GT. ABS(XMMAX(I,IS))) XMMAX(I,IS) = DUMYY(I)
  110 CONTINUE
      WRITE (6,5) (X(I,IS),DUMYX(I),DUMYY(I), I = 1, NISP1)
  111 CONTINUE
C     REFERENCE IS UPWARD, POSITIVE CCW LOOKING AFT
C     IMAGINARY PART IS SIDE COMPONENT (POSITIVE STARBOARD)
C     REAL PART IS VERTICAL COMPONENT, (POSITIVE UPWARDS)
C     DATA TO SET UP PLOTTER FOR RESULTANT SHEAR PLOT
      DO 112  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 112  I = 1,NISP1
  112 AERO(I,IS) = REAL(CXS(I,IS))
      CALL SCALE (AERO,YB,YT,DY,MRT,JLABL)
      CALL SETMIV(24,0,529,0)
      CALL GRIDIV(1,XL,XR,YB,YT,DX,DY,NRT,MRT,ILABL,JLABL,NX,-NY)
      CALL APRNTV(0,-12,6,6H SHEAR,0,840)
      CALL APRNTV(0,-12,7,7H MOMENT,0,300)
      CALL PRINTV (16,16H MISSILE STATION,495,0)
      BATCH = FLOAT(IBATCH)
      CALL PRINTV(5,5H CASE,700,1023)
      CALL LABLV(BATCH,796,1023,6,1,6)
      CALL PRINTV(10,10H RESULTANT,700,1013)
      IXL = NXV(XL)
      IXR = 1023 - NXV(XR)
      IYB = NYV(YB)
      IYT = 1023 - NYV(YT)
      CALL XSCALV(XL,XR,IXL,IXR)
      CALL YSCALV(YB,YT,IYB,IYT)
      LINX2 = NXV(A(1))
      LINY2 = NYV(0.0)
      IERR = 0
      DO 101  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 100  I = 1,NISP1
      DUMYX(I) = X(I,IS)
  100 DUMYY(I) = REAL(CXS(I,IS))
      CALL APLOTV(NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      IF (LIN) 103,103,102
  102 NIS = N(IS)
      LINX1 = NXV(DUMYX(1))
      LINY1 = NYV(DUMYY(1))
      CALL LINEV(LINX2,LINY2,LINX1,LINY1)
      DO 104  I = 1,NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
```

```
  104 CALL LINEV(LINX1,LINY1,LINX2,LINY2)
  103 CONTINUE
  101 CONTINUE
C     DATA TO SET UP PLOTTER FOR RESULTANT MOMENT PLOT
      DO 113  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 113  I = 1,NISP1
  113 AERO(I,IS) = REAL(CXM(I,IS))
      CALL SCALE (AERO,YB,YT,DY,MRT,JLABL)
      CALL SETMIV(24,0,24,505)
      CALL GRID1V(2,XL,XR,YB,YT,DX,DY,NRT,MRT,ILABL,JLABL,NX,-NY)
      IYB = NYV(YB)
      IYT = 1023 - NYV(YT)
      CALL XSCALV(XL,XR,IXL,IXR)
      CALL YSCALV(YB,YT,IYB,IYT)
      LINX2 = NXV(A(1))
      LINY2 = NYV(0.0)
C     PLOT RESULTANT MOMENT
      DO 105  IS = 1,ISEGS
      NISP1 = N(IS) + 1
      DO 106  I = 1,NISP1
      DUMYX(I) = X(I,IS)
  106 DUMYY(I) = REAL(CXM(I,IS))
      CALL APLOTV(NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
      IF (LIN) 109,109,107
  107 NIS = N(IS)
      LINX1 = NXV(DUMYX(1))
      LINY1 = NYV(DUMYY(1))
      CALL LINEV(LINX2,LINY2,LINX1,LINY1)
      DO 108  I = 1,NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
  108 CALL LINEV(LINX1,LINY1,LINX2,LINY2)
  109 CONTINUE
  105 CONTINUE
      IF (IERR .GT. 0) WRITE (6,1) IBATCH
    1 FORMAT (34H1PLOTTER ERROR IN RESULTANT, CASE ,I6)
      WRITE (6,6)
    6 FORMAT (1H0)
      CALL SETMIV(24,0,24,24)
      CALL FRAMEV
      CALL ENDPLT
      RETURN
      END
```

INPUT DATA

Data are supplied to RSLTNT through subroutine arguments and COMMON. The subroutine arguments are complex variables, and are also in COMMON between MAIN and RSLTNT.

OUTPUT DATA

Subroutine RSLTNT produces plotted and printed output. Examples of these outputs are in Appendixes B and C. A brief description follows of output generated by one pass through the subroutine, given in the order generated.

Plotted Output

|Resultant shear| versus X(I,IS)

|Resultant moment| versus X(I,IS)

(Both of the above plots share the same plot frame.)

Printed Output

1. IBATCH, a label to identify a load condition.

2. A tabulation of body stations, resultant shears, and resultant moments for all body stations.

SUBROUTINE ENVLOP

ENVLOP receives maximum values of resultant shears and moments encountered at each body station for all the load conditions in one computer run, and plots these as an envelope of all resultant shear and moment diagrams. The actual computations of these maxima are in subroutine RSLTNT, from where ENVLOP receives the data through COMMON. ENVLOP only plots these maxima as envelopes.

ENTRY

Entry into ENVLOP is made through the FORTRAN subroutine call: CALL ENVLOP. There are no arguments; all data are exchanged through COMMON.

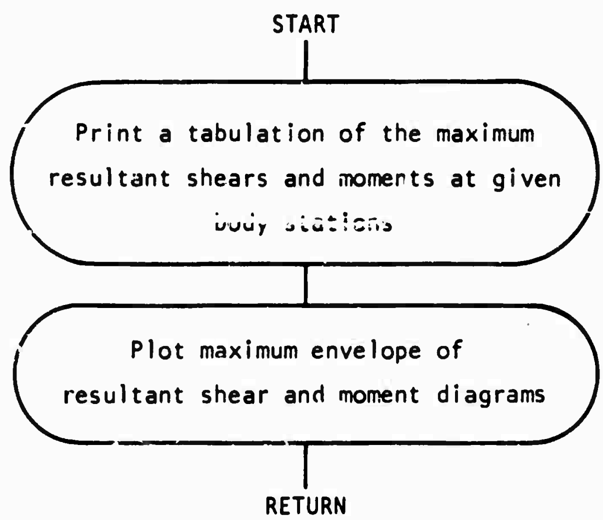
SYMBOLS AND UNITS

Algebraic symbol	FORTRAN equivalent	Definition
	IS	An index denoting an IS body segment
	I	An index denoting a body station
	N(IS)	The number of body sections in a body segment
	XSMAX(I,IS)	Maximum values of shear at given body stations encountered in a group of load conditions (lb)
	XMMAX(I,IS)	Maximum values of moments at given body stations encountered in a group of load conditions (lb-in)

EQUATIONS

Each time subroutine RSLTNT is encountered (once for each load condition), a comparison is made between the resultant shears and moments arising from the current load condition and the previous maxima. This comparison is made at each body station. The largest of these compared values is kept in memory locations associated with XSMAX(I,IS) and XMMAX(I,IS). This function is performed in lines 35 and 36 of the listing of subroutine RSLTNT. After all load conditions are run in one computer job submittal (and if the option is taken to do so), MAIN calls subroutine ENVLOP to plot the saved maxima. This is the last action taken by MAIN before it finishes.

FLOW CHART



LISTING OF ENVLOP

Following is a FORTRAN IV or V listing of ENVLOP.

```
         SUBROUTINE  ENVLOP
      C''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
      C     PLOTS ENVELOPE OF MAXIMUM SHEARS AND MOMENTS
      C''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
            DIMENSION A(25),B(25),N(25),NOPT(25),Z13(25),Z14(25),X(41,25),
           1DELCP(41,25),D(41,25),Z15(25),Z16(25),Z17(41,25),AERO(41,25)
           2,XISECT(41,25),Z18(25) ,DUMYX(41),DUMYY(41)
            DIMENSION WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
            DIMENSION XSMAX(41,25),XMMAX(41,25)
            COMMON Z1,CORRI,Z2,Z3,Z4,Z5,Z6,HF,HD,HR,BHANGR,CBAR,Z7,RHO
           1,V,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,Z13,Z14,X,DELCP,D
           2,Z15,Z16,Z17,AERO,XISECT,XCG,IPLANE,IBATCH,Z18,RALPHA
           3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
           4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
           5,ISHM,RAD
            COMMON XL,XR,DX,DY,NRT,MRT,ILABL,JLABL,NX,NY,MRKPT,LIN
           1,LINX1,LINX2,LINY1,LINY2,IXL,IXR,IYB,IYT
            COMMON XSMAX,XMMAX
          6 FORMAT (1H0)
          5 FORMAT (1P3E18.8)
          4 FORMAT (8H SEGMENT,I6)
          3 FORMAT (54H0    STATION           SHEAR               MOMENT
          2 FORMAT (26H1ENVELOPE OF MAXIMUM LOADS)
            WRITE (6,2)
            DO 111  IS = 1, ISEGS
```

```
          WRITE (6,4) IS
          WRITE (6,3)
          NISP1 = N(IS) + 1
      111 WRITE (6,5)(X(I,IS),XSMAX(I,IS),XMMAX(I,IS),I = 1,NISP1)
          CALL SCALE (XSMAX,YB,YT,DY,MRT,JLABL)
          CALL SETMIV (24,0,529,0)
          CALL GRID1V (1,XL,XR,YB,YT,DX,DY,NRT,MRT,ILABL,JLABL,NX,-NY)
          CALL APRNTV (0,-12,6,6H SHEAR,0,840)
          CALL APRNTV (0,-12,7,7H MOMENT,0,300)
          CALL PRINTV (16,16H MISSILE STATION,495,0)
          CALL PRINTV (36,36H MAXIMUM ENVELOPE OF RESULTANT LOADS,700,1023)
          IXL = NXV (XL)
          IXR = 1023 - NXV(XR)
          IYB = NYV(YB)
          IYT = 1023 - NYV(YT)
          CALL XSCALV (XL,XR,IXL,IXR)
          CALL YSCALV (YB,YT,IYB,IYT)
          LINX2 = NXV(A(1))
          LINY2 = NYV(0.0)
          IERR = 0
          DO 101  IS = 1,ISEGS
          NISP1 = N(IS) + 1
          DO 100  I = 1,NISP1
          DUMYX(I) = X(I,IS)
      100 DUMYY(I) = XSMAX(I,IS)
          CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
          IF (LIN) 103,103,102
      102 NIS = N(IS)
          LINX1 = NXV (DUMYX(1))
          LINY1 = NYV (DUMYY(1))
          CALL LINEV (LINX2,LINY2,LINX1,LINY1)
          DO 104  I = 1,NIS
          LINX1 = NXV(DUMYX(I))
          LINX2 = NXV(DUMYX(I+1))
          LINY1 = NYV(DUMYY(I))
          LINY2 = NYV(DUMYY(I+1))
      104 CALL LINEV (LINX1,LINY1,LINX2,LINY2)
      103 CONTINUE
      101 CONTINUE
          CALL SCALE (XMMAX,YB,YT,DY,MRT,JLABL)
          CALL SETMIV (24,0,24,505)
          CALL GRID1V (2,XL,XR,YB,YT,DX,DY,NRT,MRT,ILABL,JLABL,NX,-NY)
          IYB = NYV(YB)
          IYT = 1023 - NYV(YT)
          CALL XSCALV (XL,XR,IXL,IXR)
          CALL YSCALV (YB,YT,IYB,IYT)
          LINX2 = NXV(A(1))
          LINY2 = NYV(0.0)
          DO 105  IS = 1,ISEGS
          NISP1 = N(IS) + 1
          DO 106  I = 1,NISP1
          DUMYX(I) = X(I,IS)
      106 DUMYY(I) = XMMAX(I,IS)
          CALL APLOTV (NISP1,DUMYX,DUMYY,1,1,1,MRKPT,IERR)
          IF (LIN) 109,109,107
      107 NIS = N(IS)
          LINX1 = NXV(DUMYX(1))
          LINY1 = NYV(DUMYY(1))
          CALL LINEV (LINX2,LINY2,LINX1,LINY1)
```

```
      DO 108  I = 1,NIS
      LINX1 = NXV(DUMYX(I))
      LINX2 = NXV(DUMYX(I+1))
      LINY1 = NYV(DUMYY(I))
      LINY2 = NYV(DUMYY(I+1))
  108 CALL LINEV (LINX1,LINY1,LINX2,LINY2)
  109 CONTINUE
  105 CONTINUE
      IF (IERR .GT. 0) WRITE (6,1)
    1 FORMAT (26H1PLOTTER ERROR IN ENVELOPE)
      WRITE (6,6)
      CALL SETMIV (24,0,24,24)
      CALL FRAMEV
      CALL ENDPLT
      RETURN
      END
```

INPUT DATA

All data are supplied to ENVLOP through COMMON.

OUTPUT DATA

Subroutine ENVLOP produces plotted and printed output. Examples of these outputs are in Appendixes B and C. Described below is output generated by one pass through ENVLOP (which occurs only once per computer job submittal, at the very last of the job).

Plotted Output

Maximum envelope resultant shear and moment diagrams.

Printed Output

Tabulation of body stations and their maximum encountered shears and moments for a group of load conditions.

SUBROUTINE SCALE

SCALE was written to automate the specification of ordinate scaling and labeling for all plots. Entry into SCALE is made through the FORTRAN subroutine call: CALL SCALE (Y,YB,YT,DY,MRT,JLABL). The first argument, Y, is a double-subscripted array of all ordinate values to be plotted by other routines associated with the SC-4020 plotter. The second and third arguments, YB and YT are the bottom and top ordinate limits for

subsequent plots. DY, the fourth argument, is the interval between horizontal grid lines. MRT, the fifth argument, specifies that the MRTth horizontal grid line is to be retraced (darkened). The last argument, JLABL, specifies that every JLABLth horizontal grid line is to have an ordinate scale label. The first argument is furnished to the subroutine, and all of the other arguments are derived from the first for use by subsequent plotter routines.

Reference 8 describes the SC-4020 plotter subroutines used in this program to which SCALE furnishes specification data. All other plotter subroutines used by this program are described therein. SCALE is included in the present discussion only because it is unique to this program. The author is indebted to Mr. Leo D. Schultz of the Naval Weapons Center for the underlying logic of the subroutine.

LISTING OF SCALE

A FORTRAN IV or V listing of SCALE follows. Since SCALE has nothing to do with airborne stores carriage loads, it will not be discussed further. Its use is rather automatic through logic built into the program. Familiarity with the user's computer plotter facilities and software would be necessary to change this and any other of the plotter subroutines used by this program but not described herein.

```
      SUBROUTINE SCALE (Y,YB,YT,DY,MRT,JLABL)
      DIMENSION A(25),B(25),N(25),NOPT(25),Z13(25),Z14(25),X(41,25)
     1,DELCP(41,25),D(41,25),Z15(25),Z16(25),W(41,25),AERO(41,25)
     2,XISECT(41,25),H(25),WNGCLA(2),WNGCMA(2),FINCLA(2),FINCMA(2)
     3,Y(41,25)
      COMMON Z1,CORRI,Z2,Z3,Z4,Z5,Z6,HF,HD,HR,BHANGR,CBAR,Z7,RHO,V
     1,Z8,Z9,Z10,Z11,CD,ARC,Q,ISEGS,A,B,N,NOPT,Z13,Z14,X,DELCP,D
     2,Z15,Z16,W,AERO,XISECT,XCG,IPLANE,IBATCH,H,RALPHA
     3,RHSTA,FHSTA,RSBSTA,FSBSTA,WIPSI,GAM,BF,BA,WNGCLA,WNGCMA
     4,FINCLA,FINCMA,ISFHGR,ISRHGR,ISFSB,ISRSB,ISDTNT,ISFIN,ISWING
     5,ISHM,RAD
      YB = 0.0
      YT = 0.0
      MORDYT = 0
      MORDYB = 0
      DO 2  IS = 1, ISEGS
      NISP1 = N(IS) + 1
      DO 1  I = 1, NISP1
      IF (Y(I,IS) .GT. YT) YT = Y(I,IS)
    1 IF (Y(I,IS) .LT. YB) YB = Y(I,IS)
    2 CONTINUE
      IF (YT .GT. 0.0) MORDYT = INT(ALOG10(YT))
      IF (YB .LT. -0.0) MORDYB = INT(ALOG10(ABS(YB)))
      IF (MORDYB - MORDYT) 3,4,5
    3 MULTYT = (INT(YT/(10.0**MORDYT))) + 1
      MULTYB = 1
      MORDYB = MORDYT
      GO TO 6
```

```
      4 MULTYT = (INT(YT/(10.0**MORDYT))) + 1
        MULTYB = (INT((ABS(YB))/(10.0**MORDYB))) + 1
        GO TO 6
      5 MULTYT = 1
        MULTYB = (INT((ABS(YB))/(10.0**MORDYB))) + 1
        MORDYT = MORDYB
      6 CONTINUE
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
        IF (YT .LE. 0.0) GO TO 7
        YT = ((FLOAT(MULTYT))*(10.0**MORDYT))
        GO TO 8
      7 YT = 0.0
*DIAGNOSTIC*  THE TEST FOR EQUALITY BETWEEN NON-INTEGERS MAY NOT BE MEANINGFUL.
      8 IF (YB .GE. 0.0) GO TO 9
        YB =-((FLOAT(MULTYB))*(10.0**MORDYB))
        GO TO 10
      9 YB = 0.0
     10 CONTINUE
        IF (MULTYT .LT. MULTYB) GO TO 11
        IF (MULTYT - 4) 12,12,13
     11 IF (MULTYB - 4) 12,12,13
     12 DY = (10.0**MORDYT)/5.0
        MRT = 5
        JLABL = 5
        GO TO 14
     13 DY = (10.0**MORDYT)/2.0
        MRT = 2
        JLABL = 4
     14 CONTINUE
        RETURN
        END
```

RECOMMENDATIONS FOR FURTHER WORK

The computer program described in this report fills a need for estimating captive flight design loads on airborne stores, and offers the weapons designer some relief from tedious work that often must be done. As it now stands, the program is very unsophisticated, and actually is not suited for optimizing design. Procedures need to be improved in the following areas.

Distributed Aerodynamic Loads Including Interference Effects. The aerostructures designer always needs better aerodynamic loads predictions, and their distributions. This latter need is often very difficult to supply, especially in the early design stage. Furthermore, local flow field distortions due to aircraft-to-store and store-to-store interference can produce very appreciable loads. Although there is little hope of solving all the aerodynamic problems caused by the complicated variety of configurations encountered in practice, much can be done by applying existing aerodynamic loads prediction techniques.

Elasticity Considerations. Idealizations of the present program often do not predict actual loads on stores in captive flight. Even the simplest elastic treatment of the store and hangers should improve results. Furthermore, if the repertoire of hanger loads subroutines is to be expanded to include some of the more complicated statically-indeterminate multiple hook configurations, then elasticity must be accounted for.

Dynamics Considerations. Airborne weapons and aircraft are making such large strides in design innovations, and are required to operate over such a large range of conditions, that past procedures of allowing for dynamics effects through static safety factors certainly need to be replaced by rational dynamic models.

Appendix A

SHAPE, DIMENSIONS, AND CHARACTERISTICS OF SAMPLE PROBLEM STORE

This appendix describes the physical and aerodynamic characteristics of a hypothetical store treated as a sample problem. Figure A-1 is a sketch of the sample store.

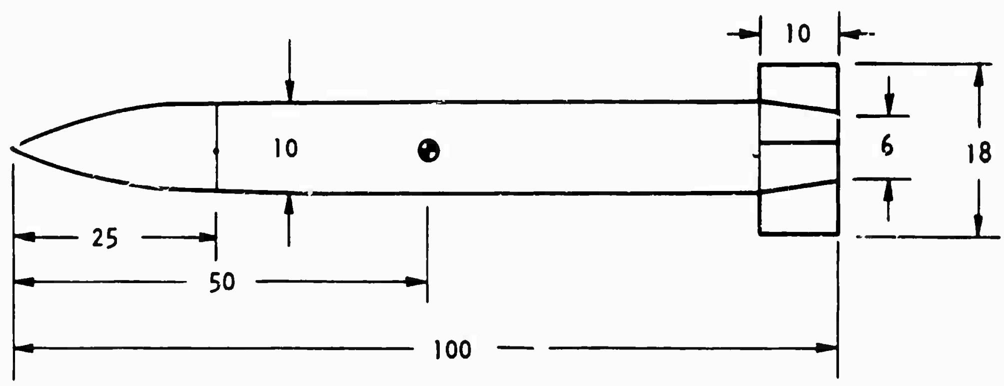


FIG. A-1. (Dimensions in inches.)

The usual problem involves a given gross weight and center of gravity, perhaps a fair idea of a weight distribution, and a computed transverse moment of inertia. Inconsistencies will actually exist between these items of data given for the sample. Given gross weight and inertia will be:

Gross weight, lb 200

Center of gravity station, inches 50

Transverse moment of inertia, lb-in^2 120,000

Assume further that the center of gravity is not vertically displaced from the axis of symmetry.

Figure A-2 shows an approximate weight distribution as supplied.

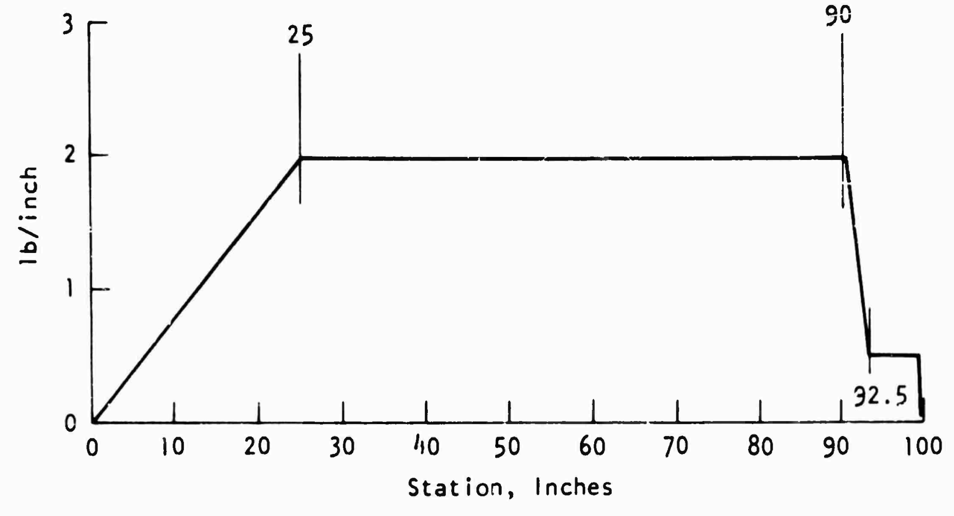


FIG. A-2. Input Weight Distribution.

For convenience, the store is segmented. Boundaries of segments chosen for the sample problem are at the following stations:

Segment	Station A	Station B
1	0	25
2	25	40
3	40	50
4	50	70
5	70	90
6	90	92.5
7	92.5	100

Station A is the forward end of a segment, and B is the aft end. These segment end points were established as points of discontinuity of the weight distribution, location of the center of gravity, or locations of a concentrated load (such as a hanger).

Figure A-3 represents the body radius distribution for the nose section.

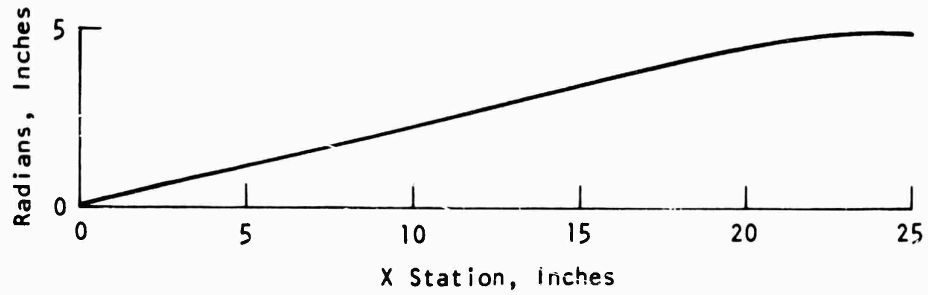


FIG. A-3. Radius Distribution of Nose Section.

Diameters taken from Fig. A-3 are combined with available distributed pressure coefficient information to provide distributed aerodynamic body loadings. Figure A-4 may be representative of such pressure coefficient data.

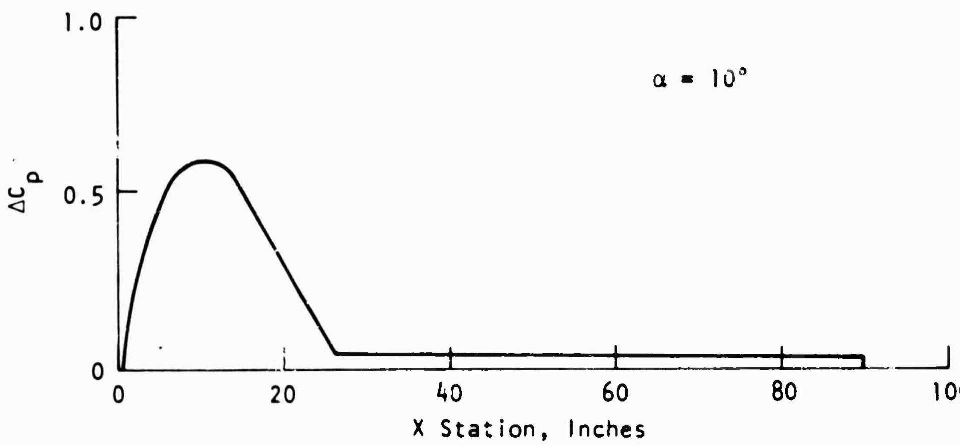


FIG. A-4. Body Pressure Coefficient Distribution.

Here,

$$\Delta C_p = \Delta p/q$$

where Δp is differential static pressure on either side of the body along the meridianal plane in which the pertinent flow angle lies, and q is dynamic pressure.

Assume, for purposes of illustration, that the tail fin lift curve slope (based on body cross-sectional area) is given as 0.12/deg. Also, assume that the fin contributes no moment about its center of pressure. Gross aerodynamic characteristics will be taken as

$$C_{L_\alpha} = 0.20/\text{deg}$$

$$C_{m_\alpha} = 0.10/\text{deg}$$

referenced to the center of gravity.

Appendix B

SAMPLE PROBLEM, STORE WITH RAIL LAUNCHER DEMONSTRATING SUBROUTINE HANGER/A

A sample problem using HANGER/A is demonstrated in this appendix. Basic mass, geometry, and aerodynamic characteristics of the store are described in Appendix A. The hanger configuration is shown in Fig. B-1.

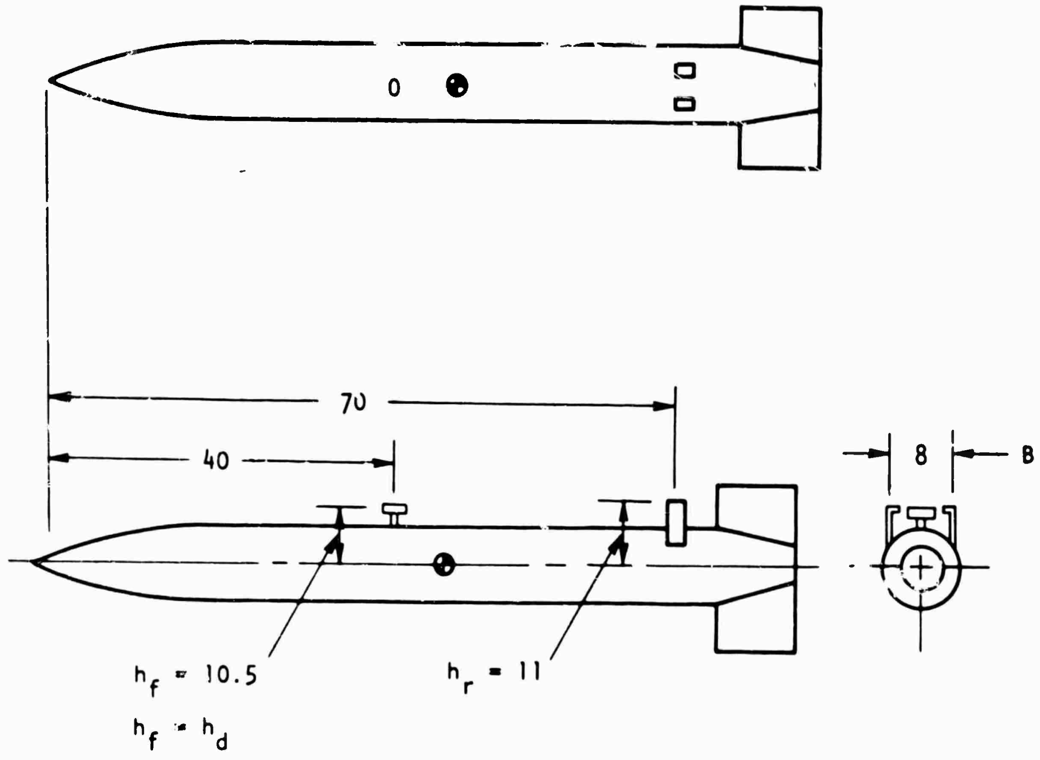


FIG. B-1. Hanger Configuration, Sample Problem.

The forward hanger is at the aft end of segment 2 (at the 40-inch station), and the aft hanger is at the aft end of segment 4 (at the 70-inch station). Hanger load points for the forward and aft hangers are 10.5 and 11.0 inches, respectively, above the longitudinal axis through the center of gravity. Forward motion on the rack or launcher is prevented by detenting against the forward hanger, and aft motion is prevented by detenting against the rear hanger. Heights of the forward

hanger and forward detent are identical. Only the aft hanger is able to resist roll moments, and the distance between the aft hanger hook load points (the moment arm of a roll couple imposed on the aft hanger) is 8 inches.

A complete sample run using HANGER/A is demonstrated using characteristics described in Appendixes A and B. Listings of input data and resulting output are included. Punched card output of WEIGHT and inertia distribution data were previously punched by another program and are used here as inputs. A Univac 1108 flagged XQT card is exemplified. It is only assumed that all program elements have been loaded into the computer from tape or cards.

TABLE B-1. Input Data for Sample Run Using HANGER/A

```
- RUN 301103,401664,000,005,200                   4062 9 0 L.P.THOMAS  71428
-R  ASG  A=2059
-  XQT  CUR
   IN  A
   TRI  A
   TOC
-  XQT,B  MAIN
 0       -00 100     +03 1       +01      5     10      3     42      1
     7
 0       -00 25      +02    40     0
 25      +02 40      +02    40     1
 40      +02 50      +02    20     1
 50      +02 70      +02    40     1
 70      +02 90      +02    40     1
 90      +02 925     +02     5     1
 925     +02 100     +03    15     1
 200     +03 50      +02 12      +06
 7853975 +02 10      +02 50      +02
   .21908-00   .28086-00   .34263-00   .40441-00   .46618-00   .52796-00
   .58974-00   .65151-00   .71329-00   .77506-00   .83684-00   .89862-00
   .96039-00   .10222+01   .10839+01   .11457+01   .12075+01   .12693+01
   .13310+01   .13928+01   .14546+01   .15164+01   .15782+01   .16399+01
   .17017+01   .17635+01   .18253+01   .18870+01   .19488+01   .20106+01
   .20724+01   .21341+01   .21959+01   .22577+01   .23195+01   .23812+01
   .24430+01   .25048+01   .25666+01   .26283+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01   .26901+01
   .26901+01   .26901+01   .24710+01
   .24710+01   .22520+01   .22520+01   .22520+01   .22520+01   .22520+01
   .22520+01   .22520+01   .22520+01   .22520+01   .22520+01   .22520+01
   .22520+01   .22520+01   .22520+01   .22520+01   .22520+01   .22520+01
```

TABLE B-1. (Continued)

.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	
.22520+01	.18813+01	.15106+01	.11400+01	.76934-00	.39868-00
.39868-00	.39868-00	.39868-00	.39868-00	.39868-00	.39868-00
.39868-00	.39868-00	.39868-00	.39868-00	.39868-00	.39868-00
.39868-00	.39868-00	.39868-00	.39868-00		
.89257-00	.22885+01	.27919+01	.32953+01	.37986+01	.43020+01
.48054+01	.53087+01	.58121+01	.63155+01	.68189+01	.73222+01
.78256+01	.83290+01	.88323+01	.93357+01	.98391+01	.10342+02
.10846+02	.11349+02	.11853+02	.12356+02	.12859+02	.13363+02
.13866+02	.14369+02	.14873+02	.15376+02	.15880+02	.16383+02
.16886+02	.17390+02	.17893+02	.18396+02	.18900+02	.19403+02
.19907+02	.20410+02	.20913+02	.21417+02	.10960+02	
.65760+01	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.65760+01	
.87680+01	.17536+02	.17536+02	.17536+02	.17536+02	.17536+02
.17536+02	.17536+02	.17536+02	.17536+02	.17536+02	.17536+02
.17536+02	.17536+02	.17536+02	.17536+02	.17536+02	.17536+02
.17536+02	.17536+02	.80539+01			
.80539+01	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.73399+01	
.73399+01	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.73399+01	
.73399+01	.12264+02	.98474+01	.74312+01	.50150+01	.12994+01
.12994+01	.25989+01	.25989+01	.25989+01	.25989+01	.25989+01
.25989+01	.25989+01	.25989+01	.25989+01	.25989+01	.25989+01
.25989+01	.25989+01	.25989+01	.12994+01		

TABLE B-1. (Continued)

0	-00 270	-00 60	-00 86	-00 122	+01 143	+01
18	+01 202	+01 228	+01 26	+01 284	+01 306	+01
342	+01 372	+01 40	+01 434	+01 464	+01 486	+01
51	+01 544	+01 58	+01 612	+01 64	+01 672	+01
698	+01 732	+01 762	+01 8	+01 824	+01 85	+01
88	+01 9	+01 92	+01 94	+01 95	+01 96	+01
~~978~~	~~+01 98~~	+01 ~~984~~	+01 ~~996~~	+01 10	+02	
10	+02 10	+02				
10	+02 10	+02				
10	+02 10	+02				
10	+02 10	+02				
10	+02 9	+01				
~~9~~	~~+01 6~~	~~+01~~				
40	+02 70	+02 25	+02 90	+02		
1	+01 5	-00 12	+01 5	+01		
30	+02 30	+02 45	+02			
2	4	1 5				
6	0					
1						
2378	-02 800	+03				
6	+01 0	-00 2	+01 15	+01 115	+02	
5	-00 2	-00-1	-00 2	-00-1	-00	
105	+02 197	+01				
0	-00 0	-00 12	-00 0	-00		
0	-00 0	-00 12	-00 0	-00		
10	+02					
0	-00 7	-01 13	-00 24	-00 29	-00 33	-00
38	-00 42	-00 46	-00 49	-00 53	-00 56	-00
57	-00 587	-00 59	-00 6	-00 6	-00 59	-00
587	-00 57	-00 56	-00 55	-00 51	-00 49	-00
46	-00 43	-00 41	-00 38	-00 35	-00 32	-00
3	-00 28	-00 25	-00 22	-00 2	-00 17	-00
14	-00 11	-00 8	-01 6	-01 5	-01	
5	-01 5	-01				
5	-01 5	-01				
5	-01 5	-01				
5	-01 5	-01				
0	-00 0	-00				
0	-00 0	-00				
1	-02					
1	-02					

TABLE B-1. (Continued)

```
      2
2378     -02 800    +03
12       +02 6      +01-2     +01 15    +01 8     +01
5        -00 2      -00-1     -00 2     -00-1     -00
105      +02 197    +01
0        -00 0      -00 12    -00 0     -00
0        -00 0      -00 12    -00 0     -00
10       +02
0        -00 7      -01 13    -00 24    -00 29    -00 33    -00
38       -00 42     -00 46    -00 49    -00 53    -00 56    -00
57       -00 587    -00 59    -00 6     -00 6     -00 59    -00
587      -00 57     -00 56    -00 55    -00 51    -00 49    -00
46       -00 43     -00 41    -00 38    -00 35    -00 32    -00
3        -00 28     -00 25    -00 22    -00 2     -00 17    -00
14       -00 11     -00 8     -01 6     -01 5     -01
5        -01 5      -01
5        -01 5      -01
5        -01 5      -01
5        -01 5      -01
C        -00 0      -00
0        -00 0      -00
1        -02
1        -02
     -1
- EOF
- FIN
```

SAMPLE OUTPUT

Table B-2 is the printout and SC-4020 plotter output for the sample problems using HANGER/A. First is a sequential listing of x stations, running weight, and section inertias--the weights and inertias are those previously read in from cards. Next, store gross weight, inertias, hanger dimensions, and reference dimensions are printed out for the purpose of verifying and identifying input data. Gross aerodynamic coefficients computed from input aerodynamic coefficient slopes and angles of attack and sideslip are then printed. These, together with linear and angular accelerations, airspeed, and air density (resulting in a dynamic pressure), are printed to indicate the data which go into environmental loads imposed on the store. Hanger loads are then tabulated--these are part of the sought-after results, often the primary purpose for running the program. Aerodynamics-related data are then printed: data associated with ΔC_p plot status, comments indicating the performance of aerodynamics adjuster routines and the magnitudes of adjustments automatically made, and tabulations of distributed aerodynamic loads including concentrated aerodynamic forces and moments. These aerodynamics-related data are not

especially significant, other than for debug purposes in showing something of what may be going on within the program, and were not cleaned up. They were not deleted either, because it seems inadvisable to let a computer work too long without some kind of output. Next are comments concerning the number of load, shear, and moment points falling off plots--these output comments are actually obsolete, assuming that plotter routines work correctly, but were left in as possible debug aids.

Following this are significant data--accumulated distributed load, shears, and moments (see discussion of SMDIAG). These important shear and moment data are listed with their stations, and are grouped into segments marked with a CASE number (IBATCH) and a PLANE number. Plane 1 implies plane of symmetry (vertical plane for zero cant), and plane 2 implies a lateral plan perpendicular to this (the horizontal plane for zero cant). All output from the not-so-significant aerodynamics-related data through printout of stations, shears, and moments are repeated for the lateral plane. Resultant shears and moments are then tabulated for the case at hand (see description of RSLTNT). These resultants are magnitude resultants of the previous two perpendicular planes' shears and moments at the given station, with no direct indication of direction, unfortunately. One loads case has now been completed, and the output is repeated for another case. After the resultant shears and moments for CASE 2 are listed, the maximum envelope of resultant loads arising from the two cases are tabulated (see ENVLOP).

Sample of plotted output for two cases via SC-4020 plotter is shown in Fig. B-2(a) through (s). Figures B-2(a) and B-2(e) are input ΔC_p for the plane of symmetry and the lateral plane. Figures B-2(b) and B-2(f) are the distributed aerodynamic loads on the missile body in each of the two perpendicular planes, with adjustments designed to ensure compatibility between gross and distributed aerodynamic forces and moments. Figures B-2(c) and B-2(g) are accumulated distributed loads, aerodynamic and inertial, imposed upon the store. No concentrated loads (such as are expected from hangers or perhaps aerodynamic surfaces) are included in these distributed loads accumulations. All plotter output discussed thus far was intended to serve the user only in depicting loads actually integrated by the computer into shears and moments, or to aid in debugging or critiqueing input data. Little effort was spent in making these plots attractive. Finished plots of shears and moments for two planes are illustrated in Fig. B-2(d) and B-2(h) (see section on SMDIAG). Discontinuities in shears and moments should correspond to hanger loads and concentrated aerodynamic loads previously printed out. Resultant shears and moments for CASE 1 produced by subroutine RSLTNT are illustrated in Fig. B-2(i). Figures B-2(j) through (r) duplicate the previously described sequence for CASE 2. Maximum envelopes of resultant shears and moments arising from the two cases are plotted in Fig. B-2(s).

For the cases run, the output is completed. Note, however, that if more cases had been run, they too would have been output in a continuing sequence, and their resultant shears and moments would have been included in the final maximum envelope plot. If the terminating IBATCH had been other than -1, the maximum envelope plot and printout would not have occurred. If the option to neglect aerodynamics had been exercised ($S = 0.0$), plots and printouts of ΔC_p and distributed aerodynamic load would not have occurred.

TABLE B-2. Sample Printout and Plotter Output

SEG	STATION	WEIGHT	SECTION INERTIA
1	.00000000	.21907999-00	.89257000-00
1	.62500000-00	.28086000-00	.22884999+01
1	.12500000+01	.34263000-00	.27919000+01
1	.18750000+01	.40441000-00	.32952999+0[illegible]
1	.25000000+01	.46618000-00	.37986000+01
1	.31250000+01	.52795999-00	.43020000+01
1	.37500000+01	.58973999-00	.48053999+01
1	.43750000+01	.65150999-00	.53087000+01
1	.50000000+01	.71329000-00	.58121000+01
1	.56250000+01	.77506000-00	.63155000+01
1	.62500000+01	.83684000-00	.68189000+01
1	.68750000+01	.89861999-00	.73221999+01
1	.75000000+01	.96038999-00	.78256000+01
1	.81250000+01	.10222000+01	.83290000+01
1	.87500000+01	.10839000+01	.88322999+01
1	.93750000+01	.11457000+01	.93356999+01
1	.10000000+02	.12075000+01	.98390999+01
1	.10625000+02	.12693000+01	.10342000+02
1	.11250000+02	.13310000+01	.10846000+02
1	.11875000+02	.13928000+01	.11349000+02
1	.12500000+02	.14546000+01	.11853000+02
1	.13125000+02	.15164000+01	.12356000+02
1	.13750000+02	.15782000+01	.12859000+02
1	.14375000+02	.16399000+01	.13363000+02
1	.15000000+02	.17017000+01	.13866000+02
1	.15625000+02	.17635000+01	.14369000+02
1	.16249999+02	.18253000+01	.14873000+02
1	.16875000+02	.18870000+01	.15376000+02
1	.17500000+02	.19488000+01	.15880000+02
1	.18125000+02	.20106000+01	.16383000+02
1	.18750000+02	.20723999+01	.16886000+02
1	.19374999+02	.21341000+01	.17389999+02
1	.20000000+02	.21958999+01	.17892999+02
1	.20625000+02	.22577000+01	.18396000+02
1	.21250000+02	.23195000+01	.18900000+02
1	.21875000+02	.23812000+01	.19402999+02
1	.22499999+02	.24429999+01	.19906999+02
1	.23125000+02	.25048000+01	.20410000+02
1	.23750000+02	.25666000+01	.20913000+02
1	.24375000+02	.26283000+01	.21416999+02
1	.25000000+02	.26901000+01	.10960000+02
2	.25000000+02	.26901000+01	.65760000+01
2	.25375000+02	.26901000+01	.13152000+02

TABLE B-2. (Continued)

2	.25749999+02	.26901000+01	.13152000+02
2	.26125000+02	.26901000+01	.13152000+02
2	.26499999+02	.26901000+01	.13152000+02
2	.26875000+02	.26901000+01	.13152000+02
2	.27249999+02	.26901000+01	.13152000+02
2	.27625000+02	.26901000+01	.13152000+02
2	.27999999+02	.26901000+01	.13152000+02
2	.28375000+02	.26901000+01	.13152000+02
2	.28749999+02	.26901000+01	.13152000+02
2	.29125000+02	.26901000+01	.13152000+02
2	.29499999+02	.26901000+01	.13152000+02
2	.29875000+02	.26901000+01	.13152000+02
2	.30249999+02	.26901000+01	.13152000+02
2	.30625000+02	.26901000+01	.13152000+02
2	.30999999+02	.26901000+01	.13152000+02
2	.31375000+02	.26901000+01	.13152000+02
2	.31750000+02	.26901000+01	.13152000+02
2	.32125000+02	.26901000+01	.13152000+02
2	.32500000+02	.26901000+01	.13152000+02
2	.32875000+02	.26901000+01	.13152000+02
2	.33250000+02	.26901000+01	.13152000+02
2	.33625000+02	.26901000+01	.13152000+02
2	.34000000+02	.26901000+01	.13152000+02
2	.34375000+02	.26901000+01	.131[illegible]000+02
2	.34750000+02	.26901000+01	.13152000+02
2	.35125000+02	.26901000+01	.13152000+02
2	.35500000+02	.26901000+01	.13152000+02
2	.35874999+02	.26901000+01	.13152000+02
2	.36250000+02	.26901000+01	.13152000+02
2	.36624999+02	.26901000+01	.13152000+02
2	.37000000+02	.26901000+01	.13152000+02
2	.37374999+02	.26901000+01	.13152000+02
2	.37750000+02	.26901000+01	.13152000+02
2	.38124999+02	.26901000+01	.13152000+02
2	.38500000+02	.26901000+01	.13152000+02
2	.38874999+02	.26901000+01	.13152000+02
2	.39250000+02	.26901000+01	.13152000+02
2	.39624999+02	.26901000+01	.13152000+02
2	.40000000+02	.26901000+01	.65760000+01
3	.40000000+02	.26901000+01	.87679999+01
3	.40499999+02	.26901000+01	.17535999+02
3	.41000000+02	.26901000+01	.17535999+02
3	.41500000+02	.26901000+01	.17535999+02
3	.41999999+02	.26901000+01	.17535999+02
3	.42500000+02	.26901000+01	.17535999+02
3	.43000000+02	.26901000+01	.17535999+02
3	.43499999+02	.26901000+01	.17535999+02
3	.44000000+02	.26901000+01	.17535999+02
3	.44500000+02	.26901000+01	.17535999+02
3	.45000000+02	.26901000+01	.17535999+02
3	.45[illegible]0000+02	.26901000+01	.17535999+02
3	.45999999+02	.26901000+01	.17535999+02
3	.46500000+02	.26901000+01	.17535999+02
3	.47000000+02	.26901000+01	.17535999+02
3	.47499999+02	.26901000+01	.17535999+02

TABLE B-2. (Continued)

3	.48000000+02	.26901000+01	.17535999+02
3	.48500000+02	.26901000+01	.17535999+02
3	.48999999+02	.26901000+01	.17535999+02
3	.49500000+02	.26901000+01	.17535999+02
3	.50000000+02	.24710000+01	.80538999+01
4	.50000000+02	.24710000+01	.80538999+01
4	.50500000+02	.22520000+01	.14680000+02
4	.51000000+02	.22520000+01	.14680000+02
4	.51499999+02	.22520000+01	.14680000+02
4	.52000000+02	.22520000+01	.14680000+02
4	.52500000+02	.22520000+01	.14680000+02
4	.52999999+02	.22520000+01	.14680000+02
4	.53500000+02	.22520000+01	.14680000+02
4	.54000000+02	.22520000+01	.14680000+02
4	.54499999+02	.22520000+01	.14680000+02
4	.55000000+02	.22520000+01	.14680000+02
4	.55500000+02	.22520000+01	.14680000+02
4	.55999999+02	.22520000+01	.14680000+02
4	.56500000+02	.22520000+01	.14680000+02
4	.57000000+02	.22520000+01	.14680000+02
4	.57500000+02	.22520000+01	.14680000+02
4	.58000000+02	.22520000+01	.14680000+02
4	58499999+02	.22520000+01	.14680000+02
4	.59000000+02	.22520000+01	.14680000+02
4	.59500000+02	.22520000+01	.14680000+02
4	.59999999+02	.22520000+01	.14680000+02
4	.60500000+02	.22520000+01	.14680000+02
4	.61000000+02	.22520000+01	.14680000+02
4	.61499999+02	.22520000+01	.14680000+02
4	.62000000+02	.22520000+01	.14680000+02
4	.62500000+02	.22520000+01	.14680000+02
4	.63000000+02	.22520000+01	.14680000+02
4	.63500000+02	.22520000+01	.14680000+02
4	.64000000+02	.22520000+01	.14680000+02
4	.64500000+02	.22520000+01	.14680000+02
4	.65000000+02	.22520000+01	.14680000+02
4	.65499999+02	.22520000+01	.14680000+02
4	.66000000+02	.22520000+01	.14680000+02
4	.66500000+02	.22520000+01	.14680000+02
4	.66999999+02	.22520000+01	.14680000+02
4	.67500000+02	.22520000+01	.14680000+02
4	.68000000+02	.22520000+01	.14680000+02
4	.68499999+02	.22520000+01	.14680000+02
4	.69000000+02	.22520000+01	.14680000+02
4	.69500000+02	.22520000+01	.14680000+02
4	.70000000+02	.22520000+01	.73399000+01
5	.70000000+02	.22520000+01	.73399000+01
5	.70500000+02	.22520000+01	.14680000+02
5	.70999999+02	.22520000+01	.14680000+02
5	.71500000+02	.22520000+01	.14680000+02
5	.72000000+02	.22520000+01	.14680000+02
5	.72499999+02	.22520000+01	.14680000+02
5	.73000000+02	.22520000+01	.14680000+02
5	.73500000+02	.22520000+01	.14680000+02
5	.73999999+02	.22520000+01	.14680000+02
5	.74500000+02	.22520000+01	.14680000+02

TABLE B-2. (Continued)

5	.75000000+02	.22520000+01	.14680000+02
5	.75500000+02	.22520000+01	.14680000+02
5	.76000000+02	.22520000+01	.14680000+02
5	.76500000+02	.22520000+01	.14680000+02
5	.77000000+02	.22520000+01	.14680000+02
5	.77500000+02	.22520000+01	.14680000+02
5	.77999999+02	.22520000+01	.14680000+02
5	.78500000+02	.22520000+01	.14680000+02
5	.79000000+02	.22520000+01	.14680000+02
5	.79499999+02	.22520000+01	.14680000+02
5	.80000000+02	.22520000+01	.14680000+02
5	.80500000+02	.22520000+01	.14680000+02
5	.80999999+02	.22520000+01	.14680000+02
5	.81500000+02	.22520000+01	.14680000+02
5	.82000000+02	.22520000+01	.14680000+02
5	.82500000+02	.22520000+01	.14680000+02
5	.83000000+02	.22520000+01	.14680000+02
5	.83499999+02	.22520000+01	.14680000+02
5	.84000000+02	.22520000+01	.14680000+02
5	.84500000+02	.22520000+01	.14680000+02
5	.84999999+02	.22520000+01	.14680000+02
5	.85500000+02	.22520000+01	.14680000+02
5	.86000000+02	.22520000+01	.14680000+02
5	.86499999+02	.22520000+01	.14680000+02
5	.87000000+02	.22520000+01	.14680000+02
5	.87500000+02	.22520000+01	.14680000+02
5	.88000000+02	.22520000+01	.14680000+02
5	.88500000+02	.22520000+01	.14680000+02
5	.89000000+02	.22520000+01	.14680000+02
5	.89500000+02	.22520000+01	.14680000+02
5	.90000000+02	.22520000+01	.73399000+01
6	.90000000+02	.22520000+01	.73399000+01
6	.90499999+02	.18813000+01	.12264000+02
6	.91000000+02	.15106000+01	.98474000+01
6	.91500000+02	.11400000+01	.74312000+01
6	.91999999+02	.76933999-00	.50150000+01
6	.92500000+02	.39867999-00	.12994000+01
7	.92500000+02	.39867999-00	.12994000+01
7	.93000000+02	.39867999-00	.25989000+01
7	.93499999+02	.39867999-00	.25989000+01
7	.94000000+02	.39867999-00	.25989000+01
7	.94500000+02	.39867999-00	.25989000+01
7	.95000000+02	.39867999-00	.25989000+01
7	.95500000+02	.39867999-00	.25989000+01
7	.96000000+02	.39867999-00	.25989000+01
7	.96500000+02	.39867999-00	.25989000+01
7	.97000000+02	.39867999-00	.25989000+01
7	.97499999+02	.39867999-00	.25989000+01
7	.98000000+02	.39867999-00	.25989000+01
7	.98500000+02	.39867999-00	.25989000+01
7	.98999999+02	.39867999-00	.25989000+01
7	.99500000+02	.39867999-00	.25989000+01
7	.10000000+03	.39867999-00	.12994000+01

TABLE B-2. (Continued)

```
HANGER LOADS ON MISSILE-UP AND STARB'D ARE POSITIVE
CASE     1


MISSILE CHARACTERISTICS

WEIGHT =     .20000+03 LBS
PITCH INERTIA =     .12000+06 LB*IN**2
YAW INERTIA =     .12000+06 LB*IN**2
REFERENCE AREA =     .78540+02 SQ.IN.

CANT ANGLE =     .00000     DEGREES


HANGER DIMENSIONS, INCHES
HF          HD          HR
  .10500+02   .10500+02   .11000+02

MOMENT ARMS, INCHES
L AERO CTR    LF          LR
  .00000      -.10000+02   .20000+02
HANGER WIDTH B =     .80000+01 INCHES

REFERENCE LENGTHS, INCHES
CBAR=    .10000+02 BBAR=    .10000+02

AERODYNAMIC DATA


RHO =     .23780-02 SLUGS/CU FT
V =     .80000+03 FT/SEC  TAS
LIFT COEF =     .21000+01
DRAG COEF =     .50000-00
SIDE FORCE COEF =     .39400-00
PITCH MOMENT COEF =    -.10500+01
YAW MOMENT COEF =    -.19700-00

LOAD FACTORS
GX =     .20000+01
GY =     .15000+01
GZ =     .11500+02

ANGULAR ACCELERATIONS
RADIANS PER SQUARE SEC
THETA DOUBLE DOT =     .60000+01
PSI DOUBLE DOT =     .00000


DYNAMIC PRESSURE =     .52844+01



HANGER LOADS

RX  =    -.60752+03 LBS
RFZ =     .13825+04 LBS
```

TABLE B-2. (Continued)

RPY = .11824+03 LBS
RMZ = .45957+02 LBS
RMY = .18237+02 LBS
MM = .14421+04 LB-IN
RMZS= .20324+03 LBS
RMZP= -.15728+03 LBS
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL = -.48620859+01
DELARL = -.48620859+01
ADJUSTED SUMMED AERO FORCE COEFF = .20996296+01
ADJUSTED SUMMED AERO MOMENT COEFF = -.10498961+01
0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 1

.48621+01	.48953+01	.51286+01	.57065+01	.63790+01	.69057+01
.79003+01	.86571+01	.95932+01	.10653+02	.11742+02	.12718+02
.13830+02	.14935+02	.15751+02	.16904+02	.17739+02	.18093+02
.18661+02	.19133+02	.19804+02	.20330+02	.19762+02	.19845+02
.19376+02	.19001+02	.18824+02	.18344+02	.17507+02	.16630+02
.16172+02	.15514+02	.14359+02	.13144+02	.12247+02	.10853+02
.94854+01	.79760+01	.64686+01	.54646+01	.49183+01	

0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 2

.49183+01	.48819+01	.48454+01	.48089+01	.47725+01	.47360+01
.46995+01	.46631+01	.46266+01	.45901+01	.45537+01	.45172+01
.44807+01	.44443+01	.44078+01	.43714+01	.43349+01	.42984+01
.42620+01	.42255+01	.41890+01	.41526+01	.41161+01	.40796+01
.40432+01	.40067+01	.39702+01	.39338+01	.38973+01	.38608+01
.38244+01	.37879+01	.37514+01	.37150+01	.36785+01	.36420+01
.36056+01	.35691+01	.35326+01	.34962+01	.34597+01	

0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 3

.34597+01	.34111+01	.33625+01	.33138+01	.32652+01	.32166+01
.31680+01	.31194+01	.30707+01	.30221+01	.29735+01	.29249+01
.28763+01	.28276+01	.27790+01	.27304+01	.26818+01	.26332+01
.25845+01	.25359+01	.24873+01			

0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 4

.24873+01	.24387+01	.23901+01	.23414+01	.22928+01	.22442+01
.21956+01	.21469+01	.20983+01	.20497+01	.20011+01	.19525+01
.19038+01	.18552+01	.18066+01	.17580+01	.17094+01	.16607+01
.16121+01	.15635+01	.15149+01	.14663+01	.14176+01	.13690+01
.13204+01	.12718+01	.12232+01	.11745+01	.11259+01	.10773+01
.10287+01	.98005-00	.93143-00	.88280-00	.83418-00	.78556-00
.73694-00	.68832-00	.63970-00	.59108-00	.54246-00	

TABLE B-2. (Continued)

```
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  5
    .54246-00   .49384-00   .44522-00   .39660-00   .34798-00   .29935-00
    .25073-00   .20211-00   .15349-00   .10487+00   .56250-01   .76294-02
   -.40991-01  -.89612-01  -.13823-00  -.18685-00  -.23547-00  -.28410-00
   -.33272-00  -.38134-00  -.42996-00  -.47858-00  -.52720-00  -.57582-00
   -.62444-00  -.67306-00  -.72168-00  -.77030-00  -.81893-00  -.86755-00
   -.91617-00  -.96479-00  -.10134+01  -.10620+01  -.11107+01  -.11593+01
   -.12079+01  -.12565+01  -.13051+01  -.13538+01  -.14024+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
   -.38897+01  -.39383+01  -.39869+01  -.40355+01  -.40842+01  -.41328+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
   -.41328+01  -.41814+01  -.42300+01  -.42786+01  -.43273+01  -.43759+01
   -.44245+01  -.44731+01  -.45217+01  -.45704+01  -.46190+01  -.46676+01
   -.47162+01  -.47648+01  -.48135+01  -.48621+01
CONCENTRATED AERO FORCES AND MOMENTS
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .46884+03   .00000
   .00000      .00000
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 MOMENT POINTS FELL OFF YOUR PLOT


CASE      1
PLANE      1
SEGMENT      1
```

STATION	LOAD	SHEAR	MOMENT
0.00000000	2.17243530+00	0.00000000	-1.38709826-02
6.25000000-01	1.44993215+00	1.13198983+00	3.18182390-01
1.25000000+00	9.28730190-01	1.87532182+00	1.25014418+00
1.87500000+00	7.53344540-01	2.40097020+00	2.57866230+00
2.50000000+00	6.73793500-01	2.84695230+00	4.21081650+00
3.12500000+00	4.49574710-01	3.19800650+00	6.09204310+00
3.75000000+00	6.94162130-01	3.55542420+00	8.19466700+00
4.37500000+00	7.02783940-01	3.99196980+00	1.05454060+01

TABLE B-2. (Continued)

5.00000000+00	8.91568900-01	4.49020510+00	1.31882625+01
5.62500000+00	1.20504534+00	5.14539700+00	1.61915650+01
6.25000000+00	1.54944765+00	6.00617600+00	1.96686080+01
6.87500000+00	1.78162944+00	7.04713760+00	2.37399470+01
7.50000000+00	2.15143670+00	8.27622070+00	2.85206740+01
8.12500000+00	2.51419750+00	9.73423140+00	3.41411170+01
8.75000000+00	2.59156570+00	1.13297823+01	4.07157990+01
9.37500000+00	3.00339970+00	1.30788341+01	4.83356680+01
1.00000000+01	3.10206100+00	1.49874153+01	5.70985470+01
1.06250000+01	2.71937770+00	1.68066140+01	6.70263670+01
1.12500000+01	2.55251530+00	1.84540810+01	7.80375010+01
1.18750000+01	2.29012940+00	1.99674070+01	9.00363990+01
1.25000000+01	2.22842540+00	2.13794560+01	1.02949459+02
1.31250000+01	2.02266400+00	2.27079210+01	1.16718949+02
1.37500000+01	7.23693850-01	2.35661580+01	1.31171780+02
1.43750000+01	7.78057580-02	2.38166270+01	1.45971070+02
1.50000000+01	-1.11927223+00	2.34911680+01	1.60746930+02
1.56250000+01	-2.22162790+00	2.24471380+01	1.75094840+02
1.62499990+01	-3.12479420+00	2.07763810+01	1.88594360+02
1.68750000+01	-4.32801340+00	1.84473780+01	2.00843960+02
1.75000000+01	-5.88841010+00	1.52547462+01	2.11368040+02
1.81250000+01	-7.48740240+00	1.10748048+01	2.19588210+02
1.87500000+01	-8.66732980+00	6.02645100+00	2.24924530+02
1.93749990+01	-1.00438417+01	1.79209890-01	2.26855970+02
2.00000000+01	-1.19178108+01	-6.68380660+00	2.24815470+02
2.06250000+01	-1.38502745+01	-1.47363331+01	2.18113850+02
2.12500000+01	-1.54631642+01	-2.38967830+01	2.06033180+02
2.18750000+01	-1.75711180+01	-3.42199960+01	1.87863860+02
2.24999990+01	-1.96531980+01	-4.58525950+01	1.62833350+02
2.31250000+01	-2.18753560+01	-5.88302680+01	1.30112140+02
2.37500000+01	-2.40943240+01	-7.31957930+01	8.88461830+01
2.43750000+01	-2.58074730+01	-8.87901050+01	3.82177580+01
2.50000000+01	-2.70629500+01	-1.05312110+02	-2.22766770+01

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	-2.70629500+01	-1.05312110+02	-2.23788720+01
2.53750000+01	-2.70837390+01	-1.15464615+02	-6.38767020+01
2.57499990+01	-2.71045280+01	-1.25624914+02	-1.09080988+02
2.61250000+01	-2.71253160+01	-1.35793010+02	-1.58096840+02
2.64999990+01	-2.71461050+01	-1.45968900+02	-2.10927200+02
2.68750000+01	-2.71668930+01	-1.56152580+02	-2.67574980+02
2.72499990+01	-2.71876820+01	-1.66344070+02	-3.28043100+02
2.76250000+01	-2.72084710+01	-1.76543350+02	-3.92334490+02
2.79999990+01	-2.72292590+01	-1.86750420+02	-4.60452070+02
2.83750000+01	-2.72500480+01	-1.96965280+02	-5.32398750+02
2.87499990+01	-2.72708360+01	-2.07187950+02	-6.08177490+02
2.91250000+01	-2.72916250+01	-2.17418420+02	-6.87791180+02
2.94999990+01	-2.73124140+01	-2.27656670+02	-7.71242760+02
2.98750000+01	-2.73332020+01	-2.37902720+02	-8.58535140+02
3.02499990+01	-2.73539910+01	-2.48156570+02	-9.49671250+02
3.06250000+01	-2.73747790+01	-2.58418220+02	-1.04465400+03

TABLE B-2. (Continued)

3.09999990+01	-2,73955680+01	-2,68687650+02	-1,14348630+03
3.13750000+01	-2,74163570+01	-2,78964880+02	-1,24617110+03
3.17500000+01	-2,74371450+01	-2,89249920+02	-1,35271140+03
3.21250000+01	-2,74579340+01	-2,99542740+02	-1,46311010+03
3.25000000+01	-2,74787220+01	-3,09843360+02	-1,57736990+03
3.28750000+01	-2,74995110+01	-3,20151780+02	-1,69549400+03
3.32500000+01	-2,75202990+01	-3,30467990+02	-1,81748520+03
3.36250000+01	-2,75410880+01	-3,40792000+02	-1,94334640+03
3.40000000+01	-2,75618770+01	-3,51123800+02	-2,07308070+03
3.43750000+01	-2,75826650+01	-3,61463410+02	-2,20669080+03
3.47500000+01	-2,76034530+01	-3,71810800+02	-2,34417960+03
3.51250000+01	-2,76242430+01	-3,82165990+02	-2,48555030+03
3.55000000+01	-2,76450310+01	-3,92528980+02	-2,63080550+03
3.58749990+01	-2,76658190+01	-4,02899760+02	-2,77994840+03
3.62500000+01	-2,76866080+01	-4,13278330+02	-2,93298180+03
3.66249990+01	-2,77073960+01	-4,23664710+02	-3,08990870+03
3.70000000+01	-2,77281850+01	-4,34058880+02	-3,25073180+03
3.73749990+01	-2,77489740+01	-4,44460850+02	-3,41545430+03
3.77500000+01	-2,77697620+01	-4,54870600+02	-3,58407880+03
3.81249990+01	-2,77905510+01	-4,65288160+02	-3,75660860+03
3.85000000+01	-2,78113390+01	-4,75713520+02	-3,93304640+03
3.88749990+01	-2,78321280+01	-4,86146670+02	-4,11339510+03
3.92500000+01	-2,78529170+01	-4,96587610+02	-4,29765780+03
3.96249990+01	-2,78737050+01	-5,07036350+02	-4,48583720+03
4.00000000+01	-2,78944940+01	-5,17492880+02	-4,67783420+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	-2,78944940+01	8.64968690+02	-4,67797040+03
4.04999990+01	-2,79222120+01	8.51014520+02	-4,24911090+03
4.10000000+01	-2,79499300+01	8.37046480+02	-3,82709570+03
4.15000000+01	-2,79776480+01	8.23064600+02	-3,41206800+03
4.19999990+01	-2,80053660+01	8.09068840+02	-3,00403460+03
4.25000000+01	-2,80330840+01	7.95059240+02	-2,60300260+03
4.30000000+01	-2,80608030+01	7.81035770+02	-2,20897880+03
4.34999990+01	-2,80885200+01	7.66998440+02	-1,82197030+03
4.40000000+01	-2,81162390+01	7.52947260+02	-1,44198390+03
4.45000000+01	-2,81439570+01	7.38882210+02	-1,06902650+03
4.50000000+01	-2,81716750+01	7.24803310+02	-7,03105170+02
4.55000000+01	-2,81993930+01	7.10710540+02	-3,44226720+02
4.59999990+01	-2,82271110+01	6.96603920+02	7,60189440+00
4.65000000+01	-2,82548290+01	6.82483430+02	3,52373730+02
4.70000000+01	-2,82825470+01	6.68349090+02	6,90081870+02
4.74999990+01	-2,83102650+01	6.54200900+02	1,02071936+03
4.80000000+01	-2,83379840+01	6.40038840+02	1,34427930+03
4.85000000+01	-2,83657010+01	6.25862920+02	1,66075470+03
4.89999990+01	-2,83934200+01	6.11673150+02	1,97013870+03
4.95000000+01	-2,84211380+01	5.97469510+02	2,27242440+03
5.00000000+01	-2,59292070+01	5.83881930+02	2,56790960+03

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

CASE 1
PLANE 1
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000 01	-2.59292070+01	5.83881930+02	2,56778440+03
5.05000000+01	-2,34418280+01	5,71539170+02	2,85653670+03
5.10000000+01	-2,34729510+01	5.59810470+02	3,13937410+03
5.14999990+01	-2,35040730+01	5.48066220+02	3,41634330+03
5.20000000+01	-2,35351950+01	5.36306410+02	3,68743640+03
5.25000000+01	-2,35663180+01	5.24531040+02	3,95264570+03
5.29999990+01	-2.35974400+01	5.12740100+02	4,21196360+03
5.35000000+01	-2,36285620+01	5.00933600+02	4,46538200+03
5.40000000+01	-2,36596850+01	4.89111540+02	4,71289310+03
5.44999990+01	-2,36908060+01	4.77273920+02	4,95448950+03
5.50000000+01	-2,37219290+01	4.65420740+02	5,19016310+03
5.55000000+01	-2.37530510+01	4,53551990+02	5,41990630+03
5.59999990+01	-2,37841730+01	4.41667690+02	5,64371120+03
5.65000000+01	-2,38152960+01	4.29767820+02	5,86157000+03
5.70000000+01	-2,38464180+01	4.17852390+02	6,07347500+03
5.75000000+01	-2,38775400+01	4.05921410+02	6,27941850+03
5.80000000+01	-2,39086620+01	3.93974860+02	6,47939250+03
5.84999990+01	-2,39397850+01	3.82012750+02	6,67338940+03
5.90000000+01	-2,39709070+01	3,70035070+02	6,86140130+03
5.95000000+01	-2,40020290+01	3.58041850+02	7,04342050+03
5.99999990+01	-2,40331520+01	3.46033050+02	7,21943920+03
6.05000000+01	-2,40642730+01	3.34008700+02	7,38944960+03
6.10000000+01	-2,40953960+01	3.21968780+02	7,55344400+03
6.14999990+01	-2,41265180+01	3.09913310+02	7,71141450+03
6.20000000+01	-2,41576400+01	2.97842260+02	7,86335330+03
6.25000000+01	-2,41887630+01	2.85755670+02	8,00925280+03
6.30000000+01	-2,42198850+01	2.73653510+02	8,14910510+03
6.35000000+01	-2,42510070+01	2.61535790+02	8,28290250+03
6.40000000+01	-2,42821290+01	2.49402510+02	8,41063690+03
6.45000000+01	-2,43132520+01	2.37253660+02	8,53230090+03
6.50000000+01	-2,43443740+01	2.25089250+02	8,64788660+03
6.54999990+01	-2,43754960+01	2.12909290+02	8,75738620+03
6.60000000+01	-2,44066190+01	..00713760+02	8,86079200+03
6.65000000+01	-2,44377410+01	1.88502670+02	8,95809610+03
6.69999990+01	-2,44688630+01	1.76276020+02	9,04929060+03
6.75000000+01	-2,44999860+01	1.64033820+02	9,13436800+03
6.80000000+01	-2,45311070+01	1.51776040+02	9,21332040+03
6.84999990+01	-2,45622300+01	1.39502700+02	9,28614000+03
6.90000000+01	-2,45933520+01	1.27213813+02	9,35281910+03
6.95000000+01	-2,46244740+01	1.14909356+02	9,41334990+03
7.00000000+01	-2,46555960+01	1.02589339+02	9,46783850+03

0 MOMENT POINTS FELL OFF YOUR PL T

CASE 1
PLANE 1
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	-2.46555960+01	1.48546020+02	2,78501040+03
7.05000000+01	-2.46867190+01	1.36210440+02	2,85608540+03
7.09999990+01	-2,47178410+01	1.23859304+02	2,92110290+03

TABLE B-2. (Continued)

7.15000000+01	-2.47489630+01	1.11492602+02	2.97994080+03
7.20000000+01	-2.47800860+01	9.91103410+01	3.03259160+03
7.24999990+01	-2.48112080+01	8.67125180+01	3.07904730+03
7.30000000+01	-2.48423300+01	7.42991330+01	3.11930020+03
7.35000000+01	-2.48734530+01	6.18701880+01	3.15334250+03
7.39999990+01	-2.49045740+01	4.94256810+01	3.18116640+03
7.45000000+01	-2.49356970+01	3.69656130+01	3.20276420+03
7.50000000+01	-2.49668190+01	2.44899840+01	3.21812810+03
7.55000000+01	-2.49979410+01	1.19987943+01	3.22725030+03
7.60000000+01	-2.50290630+01	-5.07956980-01	3.23012300+03
7.65000000+01	-2.50601860+01	-1.30302694+01	3.22673840+03
7.70000000+01	-2.50913080+01	-2.55681430+01	3.21708880+03
7.75000000+01	-2.51224300+01	-3.81215770+01	3.20116640+03
7.79999990+01	-2.51535530+01	-5.06905730+01	3.17896340+03
7.85000000+01	-2.51846750+01	-6.32751290+01	3.15047200+03
7.90000000+01	-2.52157970+01	-7.58752470+01	3.11568440+03
7.94999990+01	-2.52469190+01	-8.84909260+01	3.07459290+03
8.00000000+01	-2.52780420+01	-1.01122164+02	3.02718960+03
8.05000000+01	-2.53091630+01	-1.13768966+02	2.97346680+03
8.09999990+01	-2.53402860+01	-1.26431328+02	2.91341680+03
8.15000000+01	-2.53714080+01	-1.39109250+02	2.84703170+03
8.20000000+01	-2.54025300+01	-1.51802730+02	2.77430370+03
8.25000000+01	-2.54336530+01	-1.64511780+02	2.69522500+03
8.30000000+01	-2.54647750+01	-1.77236390+02	2.60978800+03
8.34999990+01	-2.54958970+01	-1.89976550+02	2.51798480+03
8.40000000+01	-2.55270200+01	-2.02732280+02	2.41980760+03
8.45000000+01	-2.55581420+01	-2.15503570+02	2.31524870+03
8.49999990+01	-2.55892640+01	-2.28290420+02	2.20430020+03
8.55000000+01	-2.56203860+01	-2.41092830+02	2.08695440+03
8.60000000+01	-2.56515090+01	-2.53910800+02	1.96320350+03
8.64999990+01	-2.56826300+01	-2.66744340+02	1.83303970+03
8.70000000+01	-2.57137530+01	-2.79593430+02	1.69645530+03
8.75000000+01	-2.57448760+01	-2.92458090+02	1.55344240+03
8.80000000+01	-2.57759970+01	-3.05338300+02	1.40399330+03
8.85000000+01	-2.58071200+01	-3.18234080+02	1.24810030+03
8.90000000+01	-2.58382420+01	-3.31145420+02	1.08575540+03
8.95000000+01	-2.58693640+01	-3.44072320+02	9.16950970+02
9.00000000+01	-2.59004870+01	-3.57014780+02	7.41793270+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	-2.83877800+01	-3.57014780+02	7.41679210+02
9.04999990+01	-2.43891670+01	-3.70209020+02	5.59796740+02
9.10000000+01	-2.03963150+01	-3.81405380+02	3.71930700+02
9.15000000+01	-1.64103100+01	-3.90607040+02	1.78965140+02
9.19999990+01	-1.24294130+01	-3.97816970+02	-1.81033130+01
9.25000000+01	-8.45427620+00	-4.03037890+02	-2.18259280+02

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

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CASE      1
PLANE      1
SEGMENT      7
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STATION	LOAD	SHEAR	MOMENT
9.25000000+01	-8.45427620+00	6.58054270+01	-2.18279470+02
9.30000000+01	-8.49979930+00	6.15669090+01	-1.86456590+02
9.34999990+01	-8.54532230+00	5.73056290+01	-1.56738450+02
9.40000000+01	-8.59084540+00	5.30215870+01	-1.29152660+02
9.45000000+01	-8.63636830+00	4.87147830+01	-1.03722563+02
9.50000000+01	-8.68189130+00	4.43852190+01	-8.04475640+01
9.55000000+01	-8.72741440+00	4.00328930+01	-5.93430360+01
9.60000000+01	-8.77293740+00	3.56578040+01	-4.04203620+01
9.65000000+01	-8.81846050+00	3.12599550+01	-2.36909220+01
9.70000000+01	-8.86398340+00	2.68393450+01	-9.16609720+00
9.74999990+01	-8.90950640+00	2.23959720+01	3.14273220+00
9.80000000+01	-8.95502940+00	1.79298390+01	1.32241851+01
9.85000000+01	-9.00055240+00	1.34409435+01	2.10668800+01
9.89999990+01	-9.04607550+00	8.92928660+00	2.66594380+01
9.95000000+01	-9.09159850+00	4.39486810+00	2.99904760+01
1.00000000+02	-9.13712160+00	-1.62311850-01	3.10688100+01

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    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL =    -.91222005-00
DELARL =    -.91222005-00
ADJUSTED SUMMED AERO FORCE COEFF =      .39393064-00
ADJUSTED SUMMED AERO MOMENT COEFF =     -.19698057-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  1
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.91222-00	.91846-00	.96221-00	.10707+01	.11968+01	.12956+01
.14822+01	.16242+01	.17999+01	.19987+01	.22030+01	.23861+01
.25948+01	.28020+01	.29552+01	.31716+01	.33282+01	.33946+01
.35011+01	.35896+01	.37156+01	.38143+01	.37077+01	.37232+01
.36353+01	.35649+01	.35316+01	.34417+01	.32847+01	.31202+01
.30341+01	.29107+01	.26940+01	.24661+01	.22978+01	.20363+01
.17796+01	.14964+01	.12136+01	.10253+01	.92277-00	

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    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  2
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.92277-00	.91593-00	.90909-00	.90225-00	.89541-00	.88857-00
.88172-00	.87488-00	.86804-00	.86120-00	.85436-00	.84752-00
.84067-00	.83383-00	.82699-00	.82015-00	.81331-00	.80647-00
.79962-00	.79278-00	.78594-00	.77910-00	.77226-00	.76542-00
.75857-00	.75173-00	.74489-00	.73805-00	.73121-00	.72437-00
.71752-00	.71068-00	.70384-00	.69700-00	.69016-00	.68332-00
.67647-00	.66963-00	.66279-00	.65595-00	.64911-00	

TABLE B-2. (Continued)

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  0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  3
   .64911-00   .63999-00   .63086-00   .62174-00   .61262-00   .60350-00
   .59437-00   .58525-00   .57613-00   .56701-00   .55789-00   .54876-00
   .53964-00   .53052-00   .52140-00   .51227-00   .50315-00   .49403-00
   .48491-00   .47579-00   .46666-00
  0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  4
   .46666-00   .45754-00   .44842-00   .43930-00   .43017-00   .42105-00
   .41193-00   .40281-00   .39369-00   .38456-00   .37544-00   .36632-00
   .35720-00   .34808-00   .33895-00   .32983-00   .32071-00   .31159-00
   .30246-00   .29334-00   .28422-00   .27510-00   .26598-00   .25685-00
   .24773-00   .23861-00   .22949-00   .22036-00   .21124-00   .20212-00
   .19300-00   .18388-00   .17475-00   .16563-00   .15651-00   .14739-00
   .13826-00   .12914-00   .12002+00   .11090+00   .10178+00
  0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  5
   .10178+00   .92653-01   .83531-01   .74409-01   .65287-01   .56165-01
   .47042-01   .37920-01   .28798-01   .19676-01   .10554-01   .14314-02
  -.76908-02  -.16813-01  -.25935-01  -.35057-01  -.44180-01  -.53302-01
  -.62424-01  -.71546-01  -.80668-01  -.89791-01  -.98913-01  -.10803+00
  -.11716+00  -.12628-00  -.13540-00  -.14452-00  -.15365-00  -.16277-00
  -.17189-00  -.18101-00  -.19013-00  -.19926-00  -.20838-00  -.21750-00
  -.22662-00  -.23575-00  -.24487-00  -.25399-00  -.26311-00
  0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
  -.72978-00  -.73890-00  -.74802-00  -.75714-00  -.76626-00  -.77539-00
  0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
  -.77539-00  -.78451-00  -.79363-00  -.80275-00  -.81188-00  -.82100-00
  -.83012-00  -.83924-00  -.84836-00  -.85749-00  -.86661-00  -.87573-00
  -.88485-00  -.89398-00  -.90310-00  -.91222-00
CONCENTRATED AERO FORCES AND MOMENTS
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .87964+02   .00000
   .00000      .00000
  0 LOAD POINTS FELL OFF YOUR PLOT
  0 LOAD POINTS FELL OFF YOUR PLOT
  0 LOAD POINTS FELL OFF YOUR PLOT
  0 LOAD POINTS FELL OFF YOUR PLOT
  0 LOAD POINTS FELL OFF YOUR PLOT
  0 LOAD POINTS FELL OFF YOUR PLOT
  0 LOAD POINTS FELL OFF YOUR PLOT
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  0 SHEAR POINTS FELL OFF YOUR PLOT
  0 SHEAR POINTS FELL OFF YOUR PLOT
  0 SHEAR POINTS FELL OFF YOUR PLOT
  0 MOMENT POINTS FELL OFF YOUR PLOT
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TABLE B-2. (Continued)

CASE 1
PLANE 2
SEGMENT 1

STATION	LOAD	SHEAR	MOMENT
0.00000000	5.83600050-01	0.00000000	-0.00000000
6.25000000-01	4.97167180-01	3.37739760-01	1.05543673-01
1.25000000+00	4.48269060-01	6.33188580-01	4.08958780-01
1.87500000+00	4.64035540-01	9.18283770-01	8.93793880-01
2.50000000+00	4.97550230-01	1.21877931+00	1.56162607+00
3.12500000+00	5.03703430-01	1.53167107+00	2.42114180+00
3.75000000+00	5.97589400-01	1.87582507+00	3.48598430+00
4.37500000+00	6.46970640-01	2.26475000+00	4.77991400+00
5.00000000+00	7.29936690-01	2.69503360+00	6.32984640+00
5.62500000+00	8.36064230-01	3.18440880+00	8.16717210+00
6.25000000+00	9.47776730-01	3.74185910+00	1.03316307+01
6.87500000+00	1.03820937+00	4.36247970+00	1.28642365+01
7.50000000+00	1.15423017+00	5.04761700+00	1.58048918+01
8.12500000+00	1.26873505+00	5.80479370+00	1.91962700+01
8.75000000+00	1.32938390+00	6.61670580+00	2.30779880+01
9.37500000+00	1.45301303+00	7.48620480+00	2.74851470+01
1.00000000+01	1.51690918+00	8.41430540+00	3.24540560+01
1.06250000+01	1.49064591+00	9.35416640+00	3.80067040+01
1.12500000+01	1.50457245+00	1.02901721+01	4.41455590+01
1.18750000+01	1.50042897+00	1.12292349+01	5.08703730+01
1.25000000+01	1.53371205+00	1.21774038+01	5.81849480+01
1.31250000+01	1.53974190+00	1.31378582+01	6.60959670+01
1.37500000+01	1.34043976+00	1.40379150+01	7.45883960+01
1.43750000+01	1.26336678+00	1.48516044+01	8.36163700+01
1.50000000+01	1.08273130+00	1.55847600+01	9.31277330+01
1.56250000+01	9.19642240-01	1.62105020+01	1.03063751+02
1.62499990+01	7.93699560-01	1.67459200+01	1.13362632+02
1.68750000+01	6.11160730-01	1.71849390+01	1.23966026+02
1.75000000+01	3.61458870-01	1.74888830+01	1.34801590+02
1.81250000+01	1.04290515-01	1.76344290+01	1.45777630+02
1.87500000+01	-7.44784470-02	1.76437450+01	1.56802060+02
1.93749990+01	-2.90430490-01	1.75297120+01	1.67793760+02
2.00000000+01	-5.99865230-01	1.72514950+01	1.78662890+02
2.06250000+01	-9.20499920-01	1.67763800+01	1.89296600+02
2.12500000+01	-1.18140164+00	1.61195360+01	1.99576570+02
2.18750000+01	-1.53548610+00	1.52705089+01	2.09385960+02
2.24999990+01	-1.88486728+00	1.42016485+01	2.18596010+02
2.31250000+01	-2.26075490+00	1.29061417+01	2.27067190+02
2.37500000+01	-2.63626920+00	1.13758216+01	2.34655310+02
2.43750000+01	-2.91718080+00	9.64036860+00	2.41222870+02
2.50000000+01	-3.11237630+00	7.75613200+00	2.46659270+02

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

CASE 1
PLANE 2
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	-3.11237630+00	7.75613200+00	2.46659270+02
2.53750000+01	-3.11921790+00	6.58770810+00	2.49348740+02
2.57499990+01	-3.12605950+00	5.41671860+00	2.51599570+02
2.61250000+01	-3.13290130+00	4.24316350+00	2.53410790+02
2.64999990+01	-3.13974290+00	3.06704270+00	2.54781450+02
2.68750000+01	-3.14658460+00	1.88835632+00	2.55710590+02
2.72499990+01	-3.15342610+00	7.07104330-01	2.56197240+02
2.76250000+01	-3.16026780+00	-4.76713300-01	2.56240430+02
2.79999990+01	-3.16710950+00	-1.66309654+00	2.55839230+02
2.83750000+01	-3.17395110+00	-2.85204540+00	2.54992640+02
2.87499990+01	-3.18079280+00	-4.04355990+00	2.53699710+02
2.91250000+01	-3.18763440+00	-5.23764000+00	2.51959490+02
2.94999990+01	-3.19447610+00	-6.43428580+00	2.49771010+02
2.98750000+01	-3.20131770+00	-7.63349700+00	2.47133300+02
3.02499990+01	-3.20815940+00	-8.83527400+00	2.44045400+02
3.06250000+01	-3.21500100+00	-1.00396163+01	2.40506360+02
3.09999990+01	-3.22184270+00	-1.12465246+01	2.36515210+02
3.13750000+01	-3.22868440+00	-1.24559983+01	2.32070990+02
3.17500000+01	-3.23552600+00	-1.36680376+01	2.27172730+02
3.21250000+01	-3.24236760+00	-1.48826426+01	2.21819480+02
3.25000000+01	-3.24920930+00	-1.60998130+01	2.16010270+02
3.28750000+01	-3.25605090+00	-1.73195490+01	2.09744140+02
3.32500000+01	-3.26289260+00	-1.85418510+01	2.03020130+02
3.36250000+01	-3.26973420+00	-1.97667180+01	1.95837270+02
3.40000000+01	-3.27657590+00	-2.09941510+01	1.88194610+02
3.43750000+01	-3.28341760+00	-2.22241500+01	1.80091180+02
3.47500000+01	-3.29025920+00	-2.34567140+01	1.71526020+02
3.51250000+01	-3.29710080+00	-2.46918440+01	1.62498170+02
3.55000000+01	-3.30394250+00	-2.59295390+01	1.53006660+02
3.58749990+01	-3.31078420+00	-2.71698000+01	1.43050530+02
3.62500000+01	-3.31762580+00	-2.84126270+01	1.32628830+02
3.66249990+01	-3.32446750+00	-2.96580200+01	1.21740587+02
3.70000000+01	-3.33130900+00	-3.09059770+01	1.10384836+02
3.73749990+01	-3.33815080+00	-3.21565000+01	9.85606240+01
3.77500000+01	-3.34499240+00	-3.34095900+01	8.62669830+01
3.81249990+01	-3.35183400+00	-3.46652440+01	7.35029530+01
3.85000000+01	-3.35867570+00	-3.59234650+01	6.02675700+01
3.88749990+01	-3.36551730+00	-3.71842500+01	4.65598740+01
3.92500000+01	-3.37235910+00	-3.84476020+01	3.23789020+01
3.96249990+01	-3.37920060+00	-3.97135190+01	1.77236910+01
4.00000000+01	-3.38604230+00	-4.09820020+01	2.59328170+00

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

CASE 1
PLANE 2
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	-3.38604230+00	7.72553310+01	2.59328170+00
4.04999990+01	-3.39516450+00	7.55600300+01	4.07971220+01
4.10000000+01	-3.40428670+00	7.38601670+01	7.81521710+01
4.15000000+01	-3.41340890+00	7.21557430+01	1.14656148+02
4.19999990+01	-3.42253110+00	7.04467590+01	1.50306770+02
4.25000000+01	-3.43165330+00	6.87332130+01	1.85101760+02
4.30000000+01	-3.44077550+00	6.70151070+01	2.19038840+02
4.34999990+01	-3.44989770+00	6.52924390+01	2.52115730+02
4.40000000+01	-3.45901990+00	6.35652100+01	2.84330140+02
4.45000000+01	-3.46814210+00	6.18334200+01	3.15679790+02
4.50000000+01	-3.47726430+00	6.00970690+01	3.46162410+02
4.55000000+01	-3.48638650+00	5.83561560+01	3.75775720+02
4.59999990+01	-3.49550870+00	5.66106830+01	4.04517430+02
4.65000000+01	-3.50463090+00	5.48606480+01	4.32385260+02
4.70000000+01	-3.51375310+00	5.31060520+01	4.59376930+02
4.74999990+01	-3.52287530+00	5.13468950+01	4.85490170+02
4.80000000+01	-3.53199750+00	4.95831770+01	5.10722680+02
4.85000000+01	-3.54111970+00	4.78148980+01	5.35072190+02
4.89999990+01	-3.55024190+00	4.60420580+01	5.58536430+02
4.95000000+01	-3.55936420+00	4.42646570+01	5.81113110+02
5.00000000+01	-3.23983630+00	4.25648570+01	6.02820480+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000+01	-3.23983630+00	4.25648570+01	6.02820480+02
5.05000000+01	-2.92045850+00	4.10247830+01	6.23717890+02
5.10000000+01	-2.92958070+00	3.95622740+01	6.43864650+02
5.14999990+01	-2.93870290+00	3.80952030+01	6.63279010+02
5.20000000+01	-2.94782510+00	3.66235710+01	6.81958700+02
5.25000000+01	-2.95694730+00	3.51473780+01	6.99901430+02
5.29999990+01	-2.96606950+00	3.36666240+01	7.17104930+02
5.35000000+01	-2.97519170+00	3.21813090+01	7.33566920+02
5.40000000+01	-2.98431390+00	3.06914330+01	7.49285100+02
5.44999990+01	-2.99343610+00	2.91969950+01	7.64257210+02
5.50000000+01	-3.00255830+00	2.76979980+01	7.78480950+02
5.55000000+01	-3.01168050+00	2.61944380+01	7.91954060+02
5.59999990+01	-3.02080270+00	2.46863170+01	8.04674250+02
5.65000000+01	-3.02992490+00	2.31736350+01	8.16639230+02
5.70000000+01	-3.03904710+00	2.16563930+01	8.27846740+02
5.75000000+01	-3.04816930+00	2.01345880+01	8.38294470+02

TABLE B-2. (Continued)

5.80000000+01	-3.05729150+00	1.86082230+01	8.47980170+02
5.84999990+01	-3.06641370+00	1.70772970+01	8.56901550+02
5.90000000+01	-3.07553590+00	1.55418097+01	8.65056320+02
5.95000000+01	-3.08465820+00	1.40017613+01	8.72442210+02
5.99999990+01	-3.09378040+00	1.24571517+01	8.79056930+02
6.05000000+01	-3.10290250+00	1.09079810+01	8.84898210+02
6.10000000+01	-3.11202470+00	9.35424940+00	8.89963760+02
6.14999990+01	-3.12114690+00	7.79595650+00	8.94251300+02
6.20000000+01	-3.13026910+00	6.23310250+00	8.97758570+02
6.25000000+01	-3.13939130+00	4.66568740+00	9.00483260+02
6.30000000+01	-3.14851350+00	3.09371120+00	9.02423110+02
6.35000000+01	-3.15763570+00	1.51717388+00	9.03575820+02
6.40000000+01	-3.16675790+00	-6.39245360-02	9.03939140+02
6.45000000+01	-3.17588010+00	-1.64958405+00	9.03510760+02
6.50000000+01	-3.18500230+00	-3.23980470+00	9.02288410+02
6.54999990+01	-3.19412450+00	-4.83458630+00	9.00269820+02
6.60000000+01	-3.20324670+00	-6.43392910+00	8.97452700+02
6.65000000+01	-3.21236890+00	-8.03783300+00	8.93834760+02
6.69999990+01	-3.22149110+00	-9.64629790+00	8.89413740+02
6.75000000+01	-3.23061330+00	-1.12593239+01	8.84187330+02
6.80000000+01	-3.23973550+00	-1.28769111+01	8.78153270+02
6.84999990+01	-3.24885770+00	-1.44990594+01	8.71309290+02
6.90000000+01	-3.25798000+00	-1.61257680+01	8.63653090+02
6.95000000+01	-3.26710220+00	-1.77570390+01	8.55182390+02
7.00000000+01	-3.27622440+00	-1.93928700+01	8.45894910+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	-3.27622440+00	-1.15553760+00	8.45894910+02
7.05000000+01	-3.28534660+00	-2.79593030+00	8.44907050+02
7.09999990+01	-3.29446870+00	-4.44088410+00	8.43097850+02
7.15000000+01	-3.30359090+00	-6.09039900+00	8.40465030+02
7.20000000+01	-3.31271310+00	-7.74447500+00	8.37006320+02
7.24999990+01	-3.32183530+00	-9.40311210+00	8.32719420+02
7.30000000+01	-3.33095750+00	-1.10663101+01	8.27602070+02
7.35000000+01	-3.34007970+00	-1.27340695+01	8.21651980+02
7.39999990+01	-3.34920190+00	-1.44063898+01	8.14866860+02
7.45000000+01	-3.35832410+00	-1.60832710+01	8.07244450+02
7.50000000+01	-3.36744640+00	-1.77647140+01	7.98782460+02
7.55000000+01	-3.37656860+00	-1.94507170+01	7.89478610+02
7.60000000+01	-3.38569070+00	-2.11412820+01	7.79330610+02
7.65000000+01	-3.39481290+00	-2.28364070+01	7.68336200+02
7.70000000+01	-3.40393510+00	-2.45360950+01	7.56493070+02
7.75000000+01	-3.41305730+00	-2.62403430+01	7.43798960+02
7.79999990+01	-3.42217950+00	-2.79491510+01	7.30251600+02
7.85000000+01	-3.43130170+00	-2.96625220+01	7.15848680+02
7.90000000+01	-3.44042390+00	-3.13804530+01	7.00587940+02
7.94999990+01	-3.44954610+00	-3.31029450+01	6.84467080+02
8.00000000+01	-3.45866830+00	-3.48299990+01	6.67483860+02
8.05000000+01	-3.46779060+00	-3.65616140+01	6.49635960+02
8.09999990+01	-3.47691280+00	-3.82977890+01	6.30921110+02
8.15000000+01	-3.48603490+00	-4.00385250+01	6.11337040+02
8.20000000+01	-3.49515710+00	-4.17838230+01	5.90881450+02
8.25000000+01	-3.50427930+00	-4.35336820+01	5.69552080+02

TABLE B-2. (Continued)

8.30000000+01	-3.51340150+00	-4.52881020+01	5.47346630+02
8.34999990+01	-3.52252370+00	-4.70470830+01	5.24262840+02
8.40000000+01	-3.53164590+00	-4.88106250+01	5.00298410+02
8.45000000+01	-3.54076810+00	-5.05787280+01	4.75451080+02
8.49999990+01	-3.54989030+00	-5.23513930+01	4.49718550+02
8.55000000+01	-3.55901230+00	-5.41286190+01	4.23098550+02
8.60000000+01	-3.56813470+00	-5.59104050+01	3.95588790+02
8.64999990+01	-3.57725690+00	-5.76967530+01	3.67187010+02
8.70000000+01	-3.58637910+00	-5.94876620+01	3.37890910+02
8.75000000+01	-3.59550130+00	-6.12831310+01	3.07698210+02
8.80000000+01	-3.60462350+00	-6.30831620+01	2.76606630+02
8.85000000+01	-3.61374570+00	-6.48877540+01	2.44613910+02
8.90000000+01	-3.62286790+00	-6.66969070+01	2.11717750+02
8.95000000+01	-3.63199010+00	-6.85106210+01	1.77915860+02
9.00000000+01	-3.64111230+00	-7.03288960+01	1.43205990+02

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CASE 1
PLANE 2
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	-4.10777600+00	-7.03288960+01	1.43205990+02
9.04999990+01	-3.56084820+00	-7.22460520+01	1.07562249+02
9.10000000+01	-3.01392030+00	-7.38897440+01	7.10283010+01
9.15000000+01	-2.46714260+00	-7.52600090+01	3.37408630+01
9.19999990+01	-1.92027480+00	-7.63568620+01	-4.16335390+00
9.25000000+01	-1.37340702+00	-7.71802820+01	-4.25476400+01

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 7

STATION	LOAD	SHEAR	MOMENT
9.25000000+01	-1.37340702+00	1.07836656+01	-4.25476400+01
9.30000000+01	-1.38252922+00	1.00946815+01	-3.73280530+01
9.34999990+01	-1.39165142+00	9.40113660+00	-3.24541000+01
9.40000000+01	-1.40077362+00	8.70303030+00	-2.79280580+01
9.45000000+01	-1.40989582+00	8.00036300+00	-2.37522100+01
9.50000000+01	-1.41901803+00	7.29313460+00	-1.99288350+01
9.55000000+01	-1.42814022+00	6.58134510+00	-1.64602150+01
9.60000000+01	-1.43726243+00	5.86499440+00	-1.33486311+01
9.65000000+01	-1.44638462+00	5.14408270+00	-1.05963619+01
9.70000000+01	-1.45550683+00	4.41860980+00	-8.20568680+00
9.74999990+01	-1.46462902+00	3.68857590+00	-6.17889250+00
9.80000000+01	-1.47375123+00	2.95398090+00	-4.51825330+00
9.85000000+01	-1.48287342+00	2.21482470+00	-3.22605200+00
9.89999990+01	-1.49199563+00	1.47110[illegible]	-2.30456890+00
9.95000000+01	-1.50111782+00	7.22829090-01	-1.75608482+00
1.00000000+02	-1.51024003+00	-3.00103720-02	-1.58288015+00

TABLE B-2. (Continued)

Resultant Loads
Case 1
Segment 1

STATION	SHEAR	MOMENT
0.00000000	0.00000000	1.38709825-02
6.25000000-01	1.18129974+00	3.35230510-01
1.25000000+00	1.97933313+00	1.31533560+00
1.87500000+00	2.57058400+00	2.72916960+00
2.50000000+00	3.09686300+00	4.49106350+00
3.12500000+00	3.54587950+00	6.55552550+00
3.75000000+00	4.01992050+00	8.90531600+00
4.37500000+00	4.58965310+00	1.15781331+01
5.00000000+00	5.23690240+00	1.46286438+01
5.62500000+00	6.05108000+00	1.81347580+01
6.25000000+00	7.07641580+00	2.22170370+01
6.87500000+00	8.28814680+00	2.70013640+01
7.50000000+00	9.69403240+00	3.26071060+01
8.12500000+00	1.13336175+01	3.91677490+01
8.75000000+00	1.31203947+01	4.68013870+01
9.37500000+00	1.50698094+01	5.56036880+01
1.00000000+01	1.71878780+01	6.56773160+01
1.06250000+01	1.92344140+01	7.70522120+01
1.12500000+01	2.11291440+01	8.96586970+01
1.18750000+01	2.29083620+01	1.03413480+02
1.25000000+01	2.46042740+01	1.18254299+02
1.31250000+01	2.62345760+01	1.34134220+02
1.37500000+01	2.74304000+01	1.50895540+02
1.43750000+01	2.80678080+01	1.68223810+02
1.50000000+01	2.81907740+01	1.85775000+02
1.56250000+01	2.76885230+01	2.03175630+02
1.62499990+01	2.66848990+01	2.20042990+02
1.68750000+01	2.52116620+01	2.36020920+02
1.75000000+01	2.32070740+01	2.50694870+02
1.81250000+01	2.08236500+01	2.63571810+02
1.87500000+01	1.86445670+01	2.74185940+02
1.93749990+01	1.75306280+01	2.82167290+02
2.00000000+01	1.85010080+01	2.87162710+02
2.06250000+01	2.23294970+01	2.88802450+02
2.12500000+01	2.88252610+01	2.86845740+02
2.18750000+01	3.74726100+01	2.81309990+02
2.24999990+01	4.80015330+01	2.72578270+02
2.31250000+01	6.02293020+01	2.61703420+02
2.37500000+01	7.40745110+01	2.50911850+02
2.43750000+01	8.93119210+01	2.44231580+02
2.50000000+01	1.05597339+02	2.47663170+02

SEGMENT 2

STATION	SHEAR	MOMENT
2.50000000+01	1.05597339+02	2.47672380+02
2.53750000+01	1.15652388+02	2.57400510+02
2.57499990+01	1.25741639+02	2.74228010+02
2.61250000+01	1.35859280+02	2.98683180+02
2.64999990+01	1.46001120+02	3.30762570+02
2.68750000+01	1.56164000+02	3.70113860+02
2.72499990+01	1.66345570+02	4.16232270+02
2.76250000+01	1.76543990+02	4.68599520+02
2.79999990+01	1.86757820+02	5.26754040+02
2.83750000+01	1.96985930+02	5.90313200+02

TABLE B-2. (Continued)

2.87499990+01	2.07227400+02	6.58971470+02
2.91250000+01	2.17481490+02	7.32489100+02
2.94999990+01	2.27747570+02	8.106[illegible]310+02
2.98750000+01	2.38025160+02	8.93396580+02
3.02499990+01	2.48313800+02	9.80527230+02
3.06250000+01	2.58613150+02	1.07198190+03
3.09999990+01	2.68922920+02	1.16769020+03
3.13750000+01	2.79242830+02	1.26759600+03
3.17500000+01	2.89572660+02	1.37165430+03
3.21250000+01	2.99912230+02	1.47982930+03
3.25000000+01	3.10261360+02	1.59209180+03
3.28750000+01	3.20619910+02	1.70841810+03
3.32500000+01	3.30987750+02	1.82878910+03
3.36250000+01	3.41364770+02	1.95318910+03
3.40000000+01	3.51750870+02	2.08160530+03
3.43750000+01	3.62145970+02	2.21402730+03
3.47500000+01	3.72549980+02	2.35044660+03
3.51250000[illegible]	3.82962830+02	2.49085640+03
3.55000000+01	3.93384460+02	2.63525110+03
3.58749990+01	4.03814820+02	2.78362650+03
3.62500000+01	4.14253860+02	2.93597900+03
3.66249990+01	4.24701530+02	3.09230600+03
3.70000000+01	4.35157780+02	3.25260530+03
3.73749990+01	4.45622580+02	3.41687[illegible]+03
3.77500000+01	4.56095900+02	3.585116[illegible]+03
3.81249990+01	4.66577700+02	3.75732760+03
3.85000000+01	4.77067960+02	3.93350810+03
3.88749990+01	4.87566660+02	4.11365850+03
3.92500000+01	4.98073760+02	4.29777960+03
3.96249990+01	5.08589250+02	4.48587220+03
4.00000000+01	5.19113090+02	4.67783490+03

SEGMENT 3

STATION	SHEAR	MOMENT
4.00000000+01	8.68411890+02	4.67797110+03
4.04999990+01	8.54362340+02	4.24930670+03
4.10000000+01	8.40298820+02	3.82789360+03
4.15000000+01	8.26221380+02	3.41399380+03
4.19999990+01	8.12130000+02	3.00779250+03
4.25000000+01	7.98024710+02	2.60957560+03
4.30000000+01	7.83905540+02	2.21961200+03
4.34999990+01	7.69772500+02	1.83933090+03
4.40000000+01	7.55625640+02	1.46974860+03
4.45000000+01	7.41464950+02	1.11466200+03
4.50000000+01	7.27290510+02	7.83699740+02
4.55000000+01	7.13102310+02	5.09607120+02
4.59999990+01	6.98900400+02	4.04588840+02
4.65000000+01	6.84684840+02	5.57785130+02
4.70000000+01	6.70455630+02	8.28999480+02
4.74999990+01	6.56212850+02	1.13029580+03
4.80000000+01	6.41956550+02	1.43802790+03
4.85000000+01	6.27686750+02	1.74482330+03
4.89999990+01	6.13403540+02	2.04778160+03
4.95000000+01	5.99106970+02	2.34555000+03
5.00000000+01	5.85431350+02	2.63771720+03

TABLE B-2. (Continued)

SEGMENT 4

STATION	SHEAR	MOMENT
5.00000000+01	5.85431350+02	2.63759540+03
5.05000000+01	5.73009630+02	2.92383750+03
5.10000000+01	5.61206680+02	3.20472020+03
5.14999990+01	5.49388590+02	3.48013510+03
5.20000000+01	5.37555430+02	3.74996730+03
5.25000000+01	5.25707270+02	4.01413380+03
5.29999990+01	5.13844180+02	4.27257250+03
5.35000000+01	5.01966240+02	4.52523540+03
5.40000000+01	4.90073520+02	4.77208440+03
5.44999990+01	4.78166140+02	5.01308630+03
5.50000000+01	4.66244180+02	5.24822120+03
5.55000000+01	4.54307770+02	5.47746060+03
5.59999990+01	4.42357050+02	5.70078730+03
5.65000000+01	4.30392140+02	5.91818400+03
5.70000000+01	4.18413210+02	6.12963520+03
5.75000000+01	4.06420450+02	6.33512680+03
5.80000000+01	3.94414060+02	6.53464590+03
5.84999990+01	3.82394260+02	6.72817990+03
5.90000000+01	3.70361310+02	6.91571750+03
5.95000000+01	3.58315520+02	7.09724780+03
5.99999990+01	3.46257200+02	7.27276030+03
6.05000000+01	3.34186760+02	7.44224490+03
6.10000000+01	3.22104630+02	7.60569190+03
6.14999990+01	3.10011340+02	7.76309190+03
6.20000000+01	2.97907480+02	7.91443590+03
6.25000000+01	2.85793760+02	8.05971470+03
6.30000000+01	2.73670990+02	8.19891940+03
6.35000000+01	2.61540180+02	8.33204190+03
6.40000000+01	2.49402520+02	8.45907310+03
6.45000000+01	2.37259400+02	8.58000510+03
6.50000000+01	2.25112570+02	8.69482980+03
6.54999990+01	2.12964170+02	8.80353690+03
6.60000000+01	2.00816850+02	8.90612450+03
6.65000000+01	1.88673970+02	9.00257870+03
6.69999990+01	1.76539760+02	9.09289370+03
6.75000000+01	1.64419780+02	9.17706180+03
6.80000000+01	1.52321310+02	9.25507570+03
6.84999990+01	1.40254150+02	9.32692740+03
6.90000000+01	1.28231790+02	9.39260980+03
6.95000000+01	1.16273266+02	9.45211560+03
7.00000000+01	1.04406204+02	9.50555120+03

SEGMENT 5

STATION	SHEAR	MOMENT
7.00000000+01	1.48550510+02	2.91063930+03
7.05000000+01	1.36239130+02	2.97843780+03
7.09999990+01	1.23938889+02	3.04033810+03
7.15000000+01	1.11658824+02	3.09619580+03
7.20000000+01	9.94124550+01	3.14598010+03
7.24999990+01	8.72208640+01	3.18966350+03
7.30000000+01	7.51187350+01	3.22722140+03
7.35000000+01	6.31670530+01	3.25863170+03
7.39999990+01	5.14824430+01	3.28387390+03
7.45000000+01	4.03128780+01	3.30292930+03

TABLE B-2. (Continued)

7.50000000+01	3.02546580+01	3.31578070+03
7.55000000+01	2.28539150+01	3.32241190+03
7.60000000+01	2.11473830+01	3.32280760+03
7.65000000+01	2.62923830+01	3.31695360+03
7.70000000+01	3.54365610+01	3.30483620+03
7.75000000+01	4.62796950+01	3.28644230+03
7.79999990+01	5.78851380+01	3.26175960+03
7.85000000+01	6.98828090+01	3.23077580+03
7.90000000+01	8.21083780+01	3.19347970+03
7.94999990+01	9.44798850+01	3.14985970+03
8.00000000+01	1.06952422+02	3.09990500+03
8.05000000+01	1.19499492+02	3.04360500+03
8.09999990+01	1.32104500+02	2.98094530+03
8.15000000+01	1.44756580+02	2.91192760+03
8.20000000+01	1.57448270+02	2.83652990+03
8.25000000+01	1.70174340+02	2.75474640+03
8.30000000+01	1.82930990+02	2.66656740+03
8.34999990+01	1.95715400+02	2.57198350+03
8.40000000+01	2.08525430+02	2.47098510+03
8.45000000+01	2.21359420+02	2.36356300+03
8.49999990+01	2.34216100+02	2.24970800+03
8.55000000+01	2.47094440+02	2.12941100+03
8.60000000+01	2.59993590+02	2.00266290+03
8.64999990+01	2.72912900+02	1.86945470+03
8.70000000+01	2.85851830+02	1.72977770+03
8.75000000+01	2.98809890+02	1.58362290+03
8.80000000+01	3.11786730+02	1.43098160+03
8.85000000+01	3.24782000+02	1.27184520+03
8.90000000+01	3.37795440+02	1.10620480+03
8.95000000+01	3.50826820+02	9.34051990+02
9.00000000+01	3.63875950+02	7.55490040+02

SEGMENT 6

STATION	SHEAR	MOMENT
9.00000000+01	3.63875950+02	7.55378050+02
9.04999990+01	3.77192530+02	5.70036870+02
9.10000000+01	3.88496790+02	3.78652160+02
9.15000000+01	3.97791310+02	1.82118010+02
9.19999990+01	4.05078640+02	1.85758830+01
9.25000000+01	4.10361230+02	2.22367750+02

SEGMENT 7

STATION	SHEAR	MOMENT
9.25000000+01	6.66831430+01	2.22387570+02
9.30000000+01	6.23889960+01	1.90156360+02
9.34999990+01	5.80716490+01	1.60063150+02
9.40000000+01	5.37311020+01	1.32141660+02
9.45000000+01	4.93673560+01	1.06407412+02
9.50000000+01	4.49804120+01	8.28792420+01
9.55000000+01	4.05702670+01	6.15835580+01
9.60000000+01	3.61369220+01	4.25674950+01
9.65000000+01	3.16803790+01	2.59527010+01
9.70000000+01	2.72006350+01	1.23024657+01
9.74999990+01	2.26976910+01	6.93220580+00
9.80000000+01	1.81715470+01	1.39747515+01
9.85000000+01	1.36222025+01	2.13124570+01
9.89999990+01	9.04965830+00	2.67380620+01
9.95000000+01	4.45391360+00	3.00418480+01
1.00000000+02	1.65062890-01	3.11091060+01

TABLE B-2. (Continued)

```
HANGER LOADS ON MISSILE-UP AND STARB,D ARE POSITIVE
CASE     2


MISSILE CHARACTERISTICS

WEIGHT =     .20000+03 LBS
PITCH INERTIA =     .12000+06 LB*IN**2
YAW INERTIA =     .12000+06 LB*IN**2
REFERENCE AREA =     .78540+02 SQ.IN.

CANT ANGLE =     .00000     DEGREES


HANGER DIMENSIONS, INCHES
HF            HD            HR
  .10500+02   .10500+02   .11000+02

MOMENT ARMS, INCHES
L AERO CTR    LF            LR
  .00000      -.10000+02    .20000+02
HANGER WIDTH B =     .80000+01 INCHES

REFERENCE LENGTHS, INCHES
CBAR=     .10000+02 BBAR=     .10000+02

AERODYNAMIC DATA


RHO =     .23780-02 SLUGS/CU FT
V =     .80000+03 FT/SEC   TAS
LIFT COEF =     .21000+01
DRAG COEF =     .50000-00
SIDE FORCE COEF =     .39400-00
PITCH MOMENT COEF =     -.10300+01
YAW MOMENT COEF =     -.19700-00

LOAD FACTORS
GX =     -.20000+01
GY =     .15000+01
GZ =     .60000+01

ANGULAR ACCELERATIONS
RADIANS PER SQUARE SEC
THETA DOUBLE DOT =     -.12000+02
PSI DOUBLE DOT =     .60000+01


DYNAMIC PRESSURE =     .52844+01



HANGER LOADS

RX  =     .19248+03 LBS
RFZ =     .43918+03 LBS
```

TABLE B-2. (Continued)

```
RPY =     .18040+03 LBS
RMZ =     .28923+03 LBS
RMY =    -.43925+02 LBS
MK  =     .14110+04 LB-IN
RMZS=     .32100+03 LBS
RMZP=    -.31760+02 LBS
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL =    -.48620859+01
DELARL =    -.48620859+01
ADJUSTED SUMMED AERO FORCE COEFF =       .20996296+01
ADJUSTED SUMMED AERO MOMENT COEFF =     -.10498961+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  1
   .48621+01   .48953+01   .51286+01   .57065+01   .63790+01   .69057+01
   .79000+01   .86571+01   .95932+01   .10653+02   .11742+02   .12718+02
   .13830+02   .14935+02   .15751+02   .16904+02   .17739+02   .18093+02
   .18661+02   .19133+02   .19804+02   .20330+02   .19762+02   .19845+02
   .19376+02   .19001+02   .18824+02   .18344+02   .17507+02   .16630+02
   .16172+02   .15514+02   .14359+02   .13144+02   .12247+02   .10853+02
   .94854+01   .79760+01   .64636+01   .54646+01   .49183+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  2
   .49183+01   .48819+01   .48454+01   .48089+01   .47725+01   .47360+01
   .46995+01   .46631+01   .46266+01   .45901+01   .45537+01   .45172+01
   .44807+01   .44443+01   .44078+01   .43714+01   .43349+01   .42984+01
   .42620+01   .42255+01   .41890+01   .41526+01   .41161+01   .40796+01
   .40432+01   .40067+01   .39702+01   .39338+01   .38973+01   .38608+01
   .38244+01   .37879+01   .37514+01   .37150+01   .36785+01   .36420+01
   .36056+01   .35691+01   .35326+01   .34962+01   .34597+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  3
   .34597+01   .34111+01   .33625+01   .33138+01   .32652+01   .32166+01
   .31680+01   .31194+01   .30707+01   .30221+01   .29735+01   .29249+01
   .28763+01   .28276+01   .27790+01   .27304+01   .26818+01   .26332+01
   .25845+01   .25359+01   .24873+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  4
   .24873+01   .24387+01   .23901+01   .23414+01   .22928+01   .22442+01
   .21956+01   .21469+01   .20983+01   .20497+01   .20011+01   .19525+01
   .19038+01   .18552+01   .18066+01   .17580+01   .17094+01   .16607+01
   .16121+01   .15635+01   .15149+01   .14663+01   .14176+01   .13690+01
   .13204+01   .12718+01   .12232+01   .11745+01   .11259+01   .10773+01
   .10287+01   .98005-00   .93143-00   .88280-00   .83418-00   .78556-00
   .73694-00   .68832-00   .63970-00   .59108-00   .54246-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
```

TABLE B-2. (Continued)

```
DISTRIBUTED AERO LOADS FOR SEG  5
   .54246-00   .49384-00   .44522-00   .39660-00   .34798-00   .29935-00
   .25073-00   .20211-00   .15349-00   .10487+00   .56250-01   .76294-02
  -.40991-01  -.89612-01  -.13823-00  -.18685-00  -.23547-00  -.28410-00
  -.33272-00  -.38134-00  -.42996-00  -.47858-00  -.52720-00  -.57582-00
  -.62444-00  -.67306-00  -.72168-00  -.77030-00  -.81893-00  -.86755-00
  -.91617-00  -.96479-00  -.10134+01  -.10620+01  -.11107+01  -.11593+01
  -.12079+01  -.12565+01  -.13051+01  -.13538+01  -.14024+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
  -.38897+01  -.39383+01  -.39869+01  -.40355+01  -.40842+01  -.41328+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
  -.41328+01  -.41814+01  -.42300+01  -.42786+01  -.43273+01  -.43759+01
  -.44245+01  -.44731+01  -.45217+01  -.45704+01  -.46190+01  -.46676+01
  -.47162+01  -.47648+01  -.48135+01  -.48621+01
CONCENTRATED AERO FORCES AND MOMENTS
    .00000       .00000
    .00000       .00000
    .00000       .00000
    .00000       .00000
    .00000       .00000
    .46884+03    .00000
    .00000       .00000
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 MOMENT POINTS FELL OFF YOUR PLOT

CASE        2
PLANE        1
SEGMENT       1
```

STATION	LOAD	SHEAR	MOMENT
0.00000000	3.44990710+00	0.00000000	2.77419650-02
6.25000000-01	3.07946390+00	2.04042840+00	7.08762750-01
1.25000000+00	2.90666390+00	3.91109340+00	2.58425950+00
1.87500000+00	3.07613780+00	5.78071890+00	5.62859700+00
2.50000000+00	3.33779380+00	7.78507250+00	9.88354970+00
3.12500000+00	3.45122910+00	9.90664210+00	1.54278567+01
3.75000000+00	4.02987550+00	1.22444871+01	2.23657300+01
4.37500000+00	4.36889950+00	1.48691043+01	3.08543700+01
5.00000000+00	.88454280+00	1.77608040+01	4.10668630+01
5.62500000+00	5.52122180+00	2.10126060+01	5.31992000+01

TABLE B-2. (Continued)

6.25000000+00	6.18528210+00	2.46708880+01	6.74909380+01
6.87500000+00	6.73352160+00	2.87080140+01	8.41874880+01
7.50000000+00	7.41573130+00	3.31296560+01	1.03527404+02
8.12500000+00	8.08751300+00	3.79744190+01	1.25763073+02
8.75000000+00	8.46970340+00	4.31485490+01	1.51129640+02
9.37500000+00	9.18530320+00	4.86657390+01	1.79837250+02
1.00000000+01	9.58012920+00	5.45299360+01	2.12101540+02
1.06250000+01	9.49200890+00	6.04899790+01	2.48060900+02
1.12500000+01	9.61557700+00	6.64611000+01	2.87748770+02
1.18750000+01	9.64055400+00	7.24786390+01	3.31183080+02
1.25000000+01	9.86261110+00	7.85733780+01	3.78402490+02
1.31250000+01	9.93700960+00	8.47607590+01	4.29460040+02
1.37500000+01	8.91459780+00	9.06518850+01	4.84292130+02
1.43750000+01	8.54115030+00	9.61068060+01	5.42669880+02
1.50000000+01	7.61343020+00	1.01155111+02	6.04329850+02
1.56250000+01	6.77683140+00	1.05652067+02	6.68972740+02
1.62499990+01	6.13582040+00	1.09687270+02	7.36281950+02
1.68750000+01	5.19065020+00	1.13226792+02	8.05958220+02
1.75000000+01	3.88520860+00	1.16062997+02	8.77626940+02
1.81250000+01	2.53756970+00	1.18070115+02	9.50809170+02
1.87500000+01	1.60539436+00	1.19364790+02	1.02502320+03
1.93749990+01	4.72540020-01	1.20014144+02	1.09984470+03
2.00000000+01	-1.16087698+00	1.19799040+02	1.17480200+03
2.06250000+01	-2.85639050+00	1.18543644+02	1.24929970+03
2.12500000+01	-4.23593090+00	1.16327294+02	1.32271250+03
2.18750000+01	-6.11461880+00	1.13092747+02	1.39442190+03
2.24999990+01	-7.97055030+00	1.08691133+02	1.46374500+03
2.31250000+01	-9.97016090+00	1.03084661+02	1.52994060+03
2.37500000+01	-1.19701829+01	9.62283050+01	1.59224150+03
2.43750000+01	-1.34684574+01	8.82787300+01	1.64991570+03
2.50000000+01	-1.45121893+01	7.95347780+01	1.70203230+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	-1.45121893+01	7.95347780+01	1.70223670+03
2.53750000+01	-1.45800092+01	7.40799920+01	1.73124390+03
2.57499990+01	-1.46478287+01	6.85997730+01	1.75799630+03
2.61250000+01	-1.47156485+01	6.30941220+01	1.78268890+03
2.64999990+01	-1.47834685+01	5.75630370+01	1.80531210+03
2.68750000+01	-1.48512880+01	5.20065210+01	1.82585640+03
2.72499990+01	-1.49191078+01	4.64245710+01	1.84431230+03
2.76250000+01	-1.49869278+01	4.08171900+01	1.86067010+03
2.79999990+01	-1.50547473+01	3.51843770+01	1.87492040+03
2.83750000+01	-1.51225671+01	2.95261300+01	1.88705350+03
2.87499990+01	-1.51903870+01	2.38424520+01	1.89706010+03
2.91250000+01	-1.52582068+01	1.81333400+01	1.90493060+03
2.94999990+01	-1.53260263+01	1.23987969+01	1.91065530+03
2.98750000+01	-1.53938463+01	6.63882100+00	1.91422490+03
3.02499990+01	-1.54616661+01	8.53412450-01	1.91562970+03
3.06250000+01	-1.55294859+01	-4.95742850+00	1.91486020+03
3.09999990+01	-1.55973055+01	-1.07937018+01	1.91190690+03

TABLE B-2. (Continued)

3.13750000+01	-1.56651253+01	-1.66554070+01	1.90676020+03
3.17500000+01	-1.57329452+01	-2.25425450+01	1.89941060+03
3.21250000+01	-1.58007648+01	-2.84551160+01	1.88984850+03
3.25000000+01	-1.58685846+01	-3.43931180+01	1.87806450+03
3.28750000+01	-1.59364044+01	-4.03565530+01	1.86404890+03
3.32500000+01	-1.60042240+01	-4.63454220+01	1.84779230+03
3.36250000+01	-1.60720440+01	-5.23597210+01	1.82928510+03
3.40000000+01	-1.61398630+01	-5.83994540+01	1.80851730+03
3.43750000+01	-1.62076830+01	-6.44646180+01	1.78548080+03
3.47500000+01	-1.62755030+01	-7.05552150+01	1.76016460+03
3.51250000+01	-1.63433220+01	-7.66712450+01	1.73255960+03
3.55000000+01	-1.64111430+01	-8.28127060+01	1.70265640+03
3.58749990+01	-1.64789620+01	-8.89796000+01	1.67044540+03
3.62500000+01	-1.65467820+01	-9.51719270+01	1.63591700+03
3.66249990+01	-1.66146020+01	-1.01389685+02	1.59906160+03
3.70000000+01	-1.66824210+01	-1.07632876+02	1.55986990+03
3.73749990+01	-1.67502410+01	-1.13901501+02	1.51833220+03
3.77500000+01	-1.68180610+01	-1.20195557+02	1.47443910+03
3.81249990+01	-1.68858810+01	-1.26515045+02	1.42818080+03
3.85000000+01	-1.69537010+01	-1.32859970+02	1.37954800+03
3.88749990+01	-1.70215200+01	-1.39230320+02	1.32853110+03
3.92500000+01	-1.70893400+01	-1.45626110+02	1.27512050+03
3.96249990+01	-1.71571600+01	-1.52047320+02	1.21930670+03
4.00000000+01	-1.72249790+01	-1.58493970+02	1.16087590+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	-1.72249790+01	2.80689660+02	3.18219400+03
4.04999990+01	-1.73154060+01	2.72054570+02	3.32065250+03
4.10000000+01	-1.74058320+01	2.63374250+02	3.45450980+03
4.15000000+01	-1.74962590+01	2.54648740+02	3.58401540+03
4.19999990+01	-1.75866850+01	2.45878000+02	3.70914710+03
4.25000000+01	-1.76771110+01	2.37062050+02	3.82988210+03
4.30000000+01	-1.77675370+01	2.28200890+02	3.94619790+03
4.34999990+01	-1.78579640+01	2.19294520+02	4.05807170+03
4.40000000+01	-1.79483910+01	2.10342930+02	4.16548100+03
4.45000000+01	-1.80388170+01	2.01346130+02	4.26840330+03
4.50000000+01	-1.81292430+01	1.92304110+02	4.36681580+03
4.55000000+01	-1.82196690+01	1.83216880+02	4.46069610+03
4.59999990+01	-1.83100960+01	1.74084450+02	4.55002140+03
4.65000000+01	-1.84005220+01	1.64906790+02	4.63476920+03
4.70000000+01	-1.84909490+01	1.55683930+02	4.71491690+03
4.74999990+01	-1.85813750+01	1.46415840+02	4.79044180+03
4.80000000+01	-1.86718010+01	1.37102550+02	4.86132130+03
4.85000000+01	-1.87622280+01	1.27744045+02	4.92753290+03
4.89999990+01	-1.88526540+01	1.18340326+02	4.98905400+03
4.95000000+01	-1.89430800+01	1.08891393+02	5.04586190+03
5.00000000+01	-1.72807070+01	9.98354470+01	5.09774890+03

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

CASE 2
PLANE 1
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000+01	-1.72807070+01	9.98354470+01	5.09799930+03
5.05000000+01	-1.56123244+01	9.16121900+01	5.14606710+03
5.10000000+01	-1.56959426+01	8.37851230+01	5.18991630+03
5.14999990+01	-1.57795608+01	7.59162480+01	5.22984160+03
5.20000000+01	-1.58631786+01	6.80055630+01	5.26582200+03
5.25000000+01	-1.59467968+01	6.00530700+01	5.29783670+03
5.29999990+01	-1.60304140+01	5.20587670+01	5.32586460+03
5.35000000+01	-1.61140320+01	4.40226550+01	5.34988500+03
5.40000000+01	-1.61976510+01	3.59447350+01	5.36987680+03
5.44999990+01	-1.62812690+01	2.78250040+01	5.38581920+03
5.50000000+01	-1.63648870+01	1.96634650+01	5.39769130+03
5.55000000+01	-1.64485040+01	1.14601175+01	5.40547210+03
5.59999990+01	-1.65321230+01	3.21496050+00	5.40914090+03
5.65000000+01	-1.66157410+01	-5.07200560+00	5.40867660+03
5.70000000+01	-1.66993590+01	-1.34007808+01	5.40405850+03
5.75000000+01	-1.67829770+01	-2.17713650+01	5.39526540+03
5.80000000+01	-1.68665950+01	-3.01837580+01	5.38227670+03
5.84999990+01	-1.69502130+01	-3.86379600+01	5.36507130+03
5.90000000+01	-1.70338320+01	-4.71339710+01	5.34362840+03
5.95000000+01	-1.71174500+01	-5.56717910+01	5.31792700+03
5.99999990+01	-1.72010680+01	-6.42514210+01	5.28794620+03
6.05000000+01	-1.72846850+01	-7.28728580+01	5.25366510+03
6.10000000+01	-1.73683030+01	-8.15361060+01	5.21506290+03
6.14999990+01	-1.74519220+01	-9.02411620+01	5.17211860+03
6.20000000+01	-1.75355400+01	-9.89880270+01	5.12481140+03
6.25000000+01	-1.76191580+01	-1.07776701+02	5.07312020+03
6.30000000+01	-1.77027760+01	-1.16607184+02	5.01702430+03
6.35000000+01	-1.77863940+01	-1.25479477+02	4.95650270+03
6.40000000+01	-1.78700120+01	-1.34393570+02	4.89153440+03
6.45000000+01	-1.79536300+01	-1.43349480+02	4.82209870+03
6.50000000+01	-1.80372480+01	-1.52347210+02	4.74817450+03
6.54999990+01	-1.81208660+01	-1.61386740+02	4.66974110+03
6.60000000+01	-1.82044840+01	-1.70468070+02	4.58677740+03
6.65000000+01	-1.82881020+01	-1.79591220+02	4.49926260+03
6.69999990+01	-1.83717200+01	-1.88756170+02	4.40717580+03
6.75000000+01	-1.84553380+01	-1.97962930+02	4.31049610+03
6.80000000+01	-1.85389560+01	-2.07211510+02	4.20920250+03
6.84999990+01	-1.86225740+01	-2.16501890+02	4.10327410+03
6.90000000+01	-1.87061930+01	-2.25834080+02	3.99269020+03
6.95000000+01	-1.87898110+01	-2.35208090+02	3.87742970+03
7.00000000+01	-1.88734290+01	-2.44623890+02	3.75724350+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	-1.88734290+01	4.46107440+01	3.75747170+03
7.05000000+01	-1.89570470+01	3.51531250+01	3.77764080+03
7.09999990+01	-1.90406650+01	2.56536980+01	3.79284240+03
7.15000000+01	-1.91242830+01	1.61124600+01	3.80328390+03

TABLE B-2. (Continued)

7.20000000+01	-1.92079010+01	6.52941490+00	3.80894440+03
7.24999990+01	-1.92915190+01	-3.09544030+00	3.80980290+03
7.30000000+01	-1.93751370+01	-1.27621044+01	3.80583850+03
7.35000000+01	-1.94587550+01	-2.24705770+01	3.79703040+03
7.39999990+01	-1.95423730+01	-3.22208590+01	3.78335750+03
7.45000000+01	-1.96259920+01	-4.20129500+01	3.76479910+03
7.50000000+01	-1.97096090+01	-5.18468500+01	3.74133420+03
7.55000000+01	-1.97932270+01	-6.17225590+01	3.71294180+03
7.60000000+01	-1.98768450+01	-7.16400770+01	3.67960120+03
7.65000000+01	-1.99604630+01	-8.15994040+01	3.64129130+03
7.70000000+01	-2.00440820+01	-9.16005400+01	3.59799140+03
7.75000000+01	-2.01277000+01	-1.01643484+02	3.54968030+03
7.79999990+01	-2.02113170+01	-1.11728239+02	3.49633750+03
7.85000000+01	-2.02949350+01	-1.21854801+02	3.43794170+03
7.90000000+01	-2.03785540+01	-1.32023170+02	3.37447220+03
7.94999990+01	-2.04621720+01	-1.42233350+02	3.30590810+03
8.00000000+01	-2.05457900+01	-1.52485340+02	3.23222850+03
8.05000000+01	-2.06294070+01	-1.62779140+02	3.15341230+03
8.09999990+01	-2.07130260+01	-1.73114750+02	3.06943890+03
8.15000000+01	-2.07966440+01	-1.83492160+02	2.98028710+03
8.20000000+01	-2.08802620+01	-1.93911390+02	2.88593630+03
8.25000000+01	-2.09638800+01	-2.04372420+02	2.78636540+03
8.30000000+01	-2.10474980+01	-2.14875270+02	2.68155340+03
8.34999990+01	-2.11311160+01	-2.25419920+02	2.57147970+03
8.40000000+01	-2.12147340+01	-2.36006390+02	2.45612310+03
8.45000000+01	-2.12983530+01	-2.46634650+02	2.33546280+03
8.49999990+01	-2.13819700+01	-2.57304740+02	2.20947800+03
8.55000000+01	-2.14655880+01	-2.68016620+02	2.07814770+03
8.60000000+01	-2.15492070+01	-2.78770320+02	1.94145100+03
8.64999990+01	-2.16328250+01	-2.89565820+02	1.79936690+03
8.70000000+01	-2.17164430+01	-3.00403140+02	1.65187470+03
8.75000000+01	-2.18000610+01	-3.11282260+02	1.49895[illegible]30+03
8.80000000+01	-2.18836780+01	-3.22203200+02	1.34058200+03
8.85000000+01	-2.19672970+01	-3.33165940+02	1.1767[illegible]970+03
8.90000000+01	-2.20509150+01	-3.44170490+02	1.00740565+03
8.95000000+01	-2.21345330+01	-3.55216850+02	8.32558830+02
9.00000000+01	-2.22181510+01	-3.66305020+02	6.51950220+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	-2.47054440+01	-3.66305020+02	6.52178350+02
9.04999990+01	-2.13568320+01	-3.77820580+02	4.66300000+02
9.10000000+01	-1.79966990+01	-3.87658970+02	2.74855000+02
9.15000000+01	-1.46259729+01	-3.95814630+02	7.89115030+01
9.19999990+01	-1.12431699+01	-4.02281920+02	-1.20687733+02
9.25000000+01	-7.84884620+00	-4.07054920+02	-3.23137420+02

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

CASE 2
PLANE 1
SEGMENT 7

STATION	LOAD	SHEAR	MOMENT
9.25000000+01	-7.84884620+00	6.17883990+01	-3.23097040+02
9.30000000+01	-7.90366280+00	5.78502710+01	-2.93146980+02
9.34999990+01	-7.95847930+00	5.38847360+01	-2.65213240+02
9.40000000+01	-8.01329580+00	4.98917920+01	-2.39269110+02
9.45000000+01	-8.06811240+00	4.58714400+01	-2.15328300+02
9.50000000+01	-8.12292890+00	4.18236810+01	-1.93404520+02
9.55000000+01	-8.17774550+00	3.77485130+01	-1.73511470+02
9.60000000+01	-8.23256190+00	3.36459350+01	-1.55662860+02
9.65000000+01	-8.28737850+00	2.95159510+01	-1.39872390+02
9.70000000+01	-8.34219510+00	2.[illegible]3585580+01	-1.26153764+02
9.74999990+01	-8.39701170+00	2.11[illegible]560+01	-1.14520685+02
9.80000000+01	-8.45182810+00	[illegible]615460+01	-1.04986859+02
9.85000000+01	-8.50664470+00	1.[illegible]219283+01	-9.75659930+01
9.89999990+01	-8.56146120+00	8.45490190+00	-9.22717850+01
9.95000000+01	-8.61627780+00	4.16046720+00	-8.91179430+01
1.00000000+02	-8.67109440+00	-1.61375760-01	-8.81585610+01

0 DELTA C.P.S FELL OFF YOUR PLOT
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0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL = -.91222005-00
DELARL = -.91222005-00
ADJUSTED SUMMED AERO FORCE COEFF = .39393064-00
ADJUSTED SUMMED AERO MOMENT COEFF = -.19698057-00
0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 1

.91222-00	.91846-00	.96221-00	.10707+01	.11968+01	.12956+01
.14822+01	.16242+01	.17999+01	.19987+01	.22030+01	.23861+01
.25948+01	.28020+01	.29552+01	.31716+01	.33282+01	.33946+01
.35011+01	.35896+01	.37156+01	.38143+01	.37077+01	.37232+01
.36353+01	.35649+01	.35316+01	.34417+01	.32847+01	.31202+01
.30341+01	.29107+01	.26940+01	.24661+01	.22978+01	.20363+01
.17796+01	.14964+01	.12136+01	.10253+01	.92277-00	

0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 2

.92277-00	.91593-00	.90909-00	.90225-00	.89541-00	.88857-00
.88172-00	.87488-00	.86804-00	.86120-00	.85436-00	.84752-00
.84067-00	.83383-00	.82699-00	.82015-00	.81331-00	.80647-00
.79962-00	.79278-00	.78594-00	.77910-00	.77226-00	.76542-00
.75857-00	.75173-00	.74489-00	.73805-00	.73121-00	.72437-00
.71752-00	.71068-00	.70384-00	.69700-00	.69016-00	.68332-00
.67647-00	.66963-00	.66279-00	.65595-00	.64911-00	

0 AERO LOAD POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

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DISTRIBUTED AERO LOADS FOR SEG  3
   .64911-00   .63999-00   .63086-00   .62174-00   .61262-00   .60350-00
   .59437-00   .58525-00   .57613-00   .56701-00   .55789-00   .54876-00
   .53964-00   .53052-00   .52140-00   .51227-00   .50315-00   .49403-00
   .48491-00   .47579-00   .46666-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  4
   .46666-00   .45754-00   .44842-00   .43930-00   .43017-00   .42105-00
   .41193-00   .40261-00   .39369-00   .38456-00   .37544-00   .36632-00
   .35720-00   .34808-00   .33895-00   .32983-00   .32071-00   .31159-00
   .30246-00   .29334-00   .28422-00   .27510-00   .26598-00   .25685-00
   .24773-00   .23861-00   .22949-00   .22036-00   .21124-00   .20212-00
   .19300-00   .18388-00   .17475-00   .16563-00   .15651-00   .14739-00
   .13826-00   .12914-00   .12002+00   .11090+00   .10178+00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  5
   .10178+00   .92653-01   .83531-01   .74409-01   .65287-01   .56165-01
   .47042-01   .37920-01   .28798-01   .19676-01   .10554-01   .14314-02
  -.76908-02  -.16813-01  -.25935-01  -.35057-01  -.44180-01  -.53302-01
  -.62424-01  -.71546-01  -.80668-01  -.89791-01  -.98913-01  -.10803+00
  -.11716+00  -.12628-00  -.13540-00  -.14452-00  -.15365-00  -.16277-00
  -.17189-00  -.18101-00  -.19013-00  -.19926-00  -.20838-00  -.21750-00
  -.22662-00  -.23575-00  -.24487-00  -.25399-00  -.26311-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
  -.72978-00  -.73890-00  -.74802-00  -.75714-00  -.76626-00  -.77539-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
  -.77539-00  -.78451-00  -.79363-00  -.80275-00  -.81188-00  -.82100-00
  -.83012-00  -.83924-00  -.84836-00  -.85749-00  -.86661-00  -.87573-00
  -.88485-00  -.89398-00  -.90310-00  -.91222-00
CONCENTRATED AERO FORCES AND MOMENTS
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .879[illegible] 02  .00000
   .00000      .00000
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
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    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 MOMENT POINTS FELL OFF YOUR PLOT
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TABLE B-2. (Continued)

CASE 2
PLANE 2
SEGMENT 1

STATION	LOAD	SHEAR	MOMENT
0.00000000	4.13369430-01	0.00000000	-1.38709826-02
6.25000000-01	2.81659900-01	2.17196670-01	3.23095270-02
1.25000000+00	1.88692820-01	3.64181880-01	2.06167240-01
1.87500000+00	1.61582780-01	4.73643000-01	4.60164430-01
2.50000000+00	1.53428440-01	5.72084010-01	7.79132590-01
3.12500000+00	1.19105249-01	6.57250780-01	1.15547661+00
3.75000000+00	1.73714920-01	7.48757090-01	1.58703099+00
4.37500000+00	1.85027110-01	8.60863970-01	2.08221600+00
5.00000000+00	2.31117000-01	9.90909000-01	2.65307200+00
5.62500000+00	3.01575410-01	1.15737536+00	3.31658770+00
6.25000000+00	3.78811900-01	1.36999638+00	4.09856830+00
6.87500000+00	4.35968670-01	1.62461529+00	5.02656290+00
7.50000000+00	5.19920250-01	1.92333057+00	6.12747290+00
8.12500000+00	6.03529870-01	2.27440870+00	7.43144330+00
8.75000000+00	6.34554620-01	2.66131010+00	8.96603380+00
9.37500000+00	7.29695110-01	3.08763810+00	1.07547569+01
1.00000000+01	7.66303120-01	3.55513760+00	1.28228011+01
1.06250000+01	7.13952180-01	4.01771730+00	1.51815029+01
1.12500000+01	7.03051840-01	4.46053100+00	1.78231220+01
1.18750000+01	6.75220760-01	4.89124120+00	2.07377340+01
1.25000000+01	6.86016740-01	5.31662780+00	2.39198610+01
1.31250000+01	6.70759980-01	5.74062060+00	2.73674340+01
1.37500000+01	4.51371760-01	6.09128670+00	3.10570880+01
1.43750000+01	3.55468540-01	6.34342420+00	3.49351030+01
1.50000000+01	1.57147020-01	6.50361660+00	3.89419860+01
1.56250000+01	-2.24276190-02	6.54571640+00	4.30120850+01
1.62499990+01	-1.63655340-01	6.48756550+00	4.70771540+01
1.68750000+01	-3.60227260-01	6.32385220+00	5.10729040+01
1.75000000+01	-6.22814120-01	6.01665180+00	5.49214790+01
1.81250000+01	-8.91667010-01	5.54337650+00	5.85261710+01
1.87500000+01	-1.08091992+00	4.92694310+00	6.17903280+01
1.93749990+01	-1.30610793+00	4.18099690+00	6.46287280+01
2.00000000+01	-1.62362658+00	3.26545490+00	6.69479270+01
2.06250000+01	-1.95114481+00	2.14833890+00	6.86319190+01
2.12500000+01	-2.21772940+00	8.45565680-01	6.95596810+01
2.18750000+01	-2.57625270+00	-6.52553740-01	6.96121800+01
2.24999990+01	-2.92891680+00	-2.37291920+00	6.86588880+01
2.31250000+01	-3.30688690+00	-4.32160780+00	6.65590330+01
2.37500000+01	-3.68328310+00	-6.50603590+00	6.31675770+01
2.43750000+01	-3.96383630+00	-8.89576070+00	5.83466840+01
2.50000000+01	-4.15751360+00	-1.14336824+01	5.21562400+01

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

CASE 2
PLANE 2
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	-4.15751360+00	-1.14336824+01	5.20540450+01
2.53750000+01	-4.14867820+00	-1.29910933+01	4.73722060+01
2.57499990+01	-4.13984280+00	-1.45451910+01	4.22091530+01
2.61250000+01	-4.13100730+00	-1.60959750+01	3.64639350+01
2.64999990+01	-4.12217200+00	-1.76434460+01	3.01377930+01
2.68750000+01	-4.11333660+00	-1.91876040+01	2.32319710+01
2.72499990+01	-4.10450110+00	-2.07284480+01	1.57477119+01
2.76250000+01	-4.09566570+00	-2.22659800+01	7.68625660+00
2.79999990+01	-4.08683040+00	-2.38001970+01	-9.51151620-01
2.83750000+01	-4.07799490+00	-2.53311020+01	-1.01632702+01
2.87499990+01	-4.06915960+00	-2.68586930+01	-1.99488570+01
2.91250000+01	-4.06032410+00	-2.83829710+01	-3.03066690+01
2.94999990+01	-4.05148870+00	-2.99039360+01	-4.12354640+01
2.98750000+01	-4.04265320+00	-3.14215880+01	-5.27339990+01
3.02499990+01	-4.03381790+00	-3.29359260+01	-6.48010330+01
3.06250000+01	-4.02498250+00	-3.44469500+01	-7.74353210+01
3.09999990+01	-4.01614700+00	-3.59546620+01	-9.06356240+01
3.13750000+01	-4.00731160+00	-3.74590610+01	-1.04400695+02
3.17500000+01	-3.99847630+00	-3.89601450+01	-1.18729296+02
3.21250000+01	-3.98964080+00	-4.04579170+01	-1.33620180+02
3.25000000+01	-3.98080540+00	-4.19523750+01	-1.49072110+02
3.28750000+01	-3.97197000+00	-4.34435200+01	-1.65083840+02
3.32500000+01	-3.96313460+00	-4.49313520+01	-1.81654130+02
3.36250000+01	-3.95429920+00	-4.64158710+01	-1.98781730+02
3.40000000+01	-3.94546380+00	-4.78970770+01	-2.16465410+02
3.43750000+01	-3.93662840+00	-4.93749690+01	-2.34703910+02
3.47500000+01	-3.92779300+00	-5.08495470+01	-2.53496010+02
3.51250000+01	-3.91895750+00	-5.23208130+01	-2.72840450+02
3.55000000+01	-3.91012210+00	-5.37887650+01	-2.92735990+02
3.58749990+01	-3.90128670+00	-5.52534040+01	-3.13181400+02
3.62500000+01	-3.89245130+00	-5.67147290+01	-3.34175420+02
3.66249990+01	-3.88361600+00	-5.81727420+01	-3.55716820+02
3.70000000+01	-3.87478050+00	-5.96274410+01	-3.77804350+02
3.73749990+01	-3.86594510+00	-6.10788260+01	-4.00436770+02
3.77500000+01	-3.85710960+00	-6.25268990+01	-4.23612850+02
3.81249990+01	-3.84827430+00	-6.39716580+01	-4.47331320+02
3.85000000+01	-3.83943890+00	-6.54131040+01	-4.71590970+02
3.88749990+01	-3.83060340+00	-6.68512360+01	-4.96390520+02
3.92500000+01	-3.82176810+00	-6.82860550+01	-5.21728760+02
3.96249990+01	-3.81293260+00	-6.97175610+01	-5.47604430+02
4.00000000+01	-3.80409730+00	-7.11457540+01	-5.73914100+02

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE B-2. (Continued)

CASE 2
PLANE 2
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	-3.80409730+00	1.09253571+02	-3.74050350+02
4.04999990+01	-3.79231670+00	1.07354468+02	-5.20034600+02
4.10000000+01	-3.78053610+00	1.05461256+02	-4.66830690+02
4.15000000+01	-3.76875560+00	1.03573933+02	-4.14571890+02
4.19999990+01	-3.75697500+00	1.01682500+02	-3.63255280+02
4.25000000+01	-3.74519450+00	9.98169600+01	-3.12677910+02
4.30000000+01	-3.73341390+00	9.79473080+01	-2.63430850+02
4.34999990+01	-3.72163330+00	9.60835470+01	-2.14929130+02
4.40000000+01	-3.70985280+00	9.42256760+01	-1.67351830+02
4.45000000+01	-3.69807230+00	9.23736950+01	-1.20701988+02
4.50000000+01	-3.68629170+00	9.05276050+01	-7.49766630+01
4.55000000+01	-3.67451120+00	8.86874040+01	-3.01729110+01
4.59999990+01	-3.66273070+00	8.68530940+01	1.37122130+01
4.65000000+01	-3.65095010+00	8.50246750+01	5.66816550+01
4.70000000+01	-3.63916960+00	8.32021450+01	9.87383600+01
4.74999990+01	-3.62738900+00	8.13855070+01	1.39885270+02
4.80000000+01	-3.61560840+00	7.95747570+01	1.80125330+02
4.85000000+01	-3.60382790+00	7.77698990+01	2.19461500+02
4.89999990+01	-3.59204730+00	7.59709310+01	2.57896710+02
4.95000000+01	-3.58026680+00	7.41778520+01	2.95433890+02
5.00000000+01	-3.23983630+00	7.24728260+01	3.32243920+02

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CASE 2
PLANE 2
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000+01	-3.23983630+00	7.24728260+01	3.32118760+02
5.05000000+01	-2.90296000+00	7.09371280+01	3.67868270+02
5.10000000+01	-2.89458350+00	6.94877420+01	4.02974490+02
5.14999990+01	-2.88620720+00	6.80425450+01	4.37357060+02
5.20000000+01	-2.87783070+00	6.66015360+01	4.71018080+02
5.25000000+01	-2.86945430+00	6.51647160+01	5.03959640+02
5.29999990+01	-2.86107790+00	6.37320830+01	5.36183830+02
5.35000000+01	-2.85270150+00	6.23036380+01	5.67692760+02
5.40000000+01	-2.84432510+00	6.08793820+01	5.98488520+02
5.44999990+01	-2.83594870+00	5.94593140+01	6.28573190+02
5.50000000+01	-2.82757230+00	5.80434330+01	6.57948870+02
5.55000000+01	-2.81919590+00	5.66317420+01	6.86617660+02
5.59999990+01	-2.81081950+00	5.52242380+01	7.14581650+02
5.65000000+01	-2.80244310+00	5.38209220+01	7.41842940+02
5.70000000+01	-2.79406670+00	5.24217960+01	7.68403620+02
5.75000000+01	-2.78569040+00	5.10268570+01	7.94265780+02

TABLE B-2. (Continued)

5.80000000+01	-2,77731390+00	4.96361050+01	8,19431510+02
5.84999990+01	-2,76893750+00	4.82495430+01	8,43902920+02
5.90000000+01	-2,76056110+00	4.68671690+01	8,67682090+02
5.95000000+01	-2,75218470+00	4.54889830+01	8,90771130+02
5.99999990+01	-2,74380830+00	4.41149840+01	9,13172110+02
6.05000000+01	-2,73543190+00	4.27451740+01	9,34887150+02
6.10000000+01	-2,72705550+00	4.13795530+01	9,55918330+02
6.14999990+01	-2,71867910+00	4.00[illegible]1200+01	9,76267740+02
6.20000000+01	-2,71030270+00	3.866[illegible]780+01	9,95937480+02
6.25000000+01	-2,70192630+00	3.73078170+01	1,01492965+03
6.30000000+01	-2,69354990+00	3.59589480+01	1,03324630+03
6.35000000+01	-2,68517350+00	3.46142670+01	1,05088960+03
6.40000000+01	-2,67679710+00	3.32737750+01	1,06786160+03
6.45000000+01	-2,66842070+00	3.19374710+01	1,08416440+03
6.50000000+01	-2,66004430+00	3.06053550+01	1,09980010+03
6.54999990+01	-2,65166790+00	2.92774270+01	1,11477080+03
6.60000000+01	-2,64329150+00	2.79536870+01	1,12907860+03
6.65000000+01	-2,63491510+00	2.66341360+01	1,14272550+03
6.69999990+01	-2,62653870+00	2.53187720+01	1,15571370+03
6.75000000+01	-2,61816230+00	2.40075980+01	1,16804530+03
6.80000000+01	-2,60978590+00	2.27006100+01	1,17972240+03
6.84999990+01	-2,60140950+00	2.13978110+01	1,19074690+03
6.90000000+01	-2,59303310+00	2.00992010+01	1,20112120+03
6.95000000+01	-2,58465670+00	1.88047790+01	1,21084720+03
7.00000000+01	-2,57628030+00	1.75145450+01	1,22004110+03

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CASE 2
PLANE 2
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	-2,57628030+00	-2.64101160+01	1,21992700+03
7.05000000+01	-2,56790380+00	-2.76961620+01	1,20628640+03
7.09999990+01	-2,55952750+00	-2.89780200+01	1,19211790+03
7.15000000+01	-2,55115110+00	-3.02556890+01	1,17730950+03
7.20000000+01	-2,54277470+00	-3.15291710+01	1,16186320+03
7.24999990+01	-2,53439830+00	-3.27984640+01	1,14578140+03
7.30000000+01	-2,52602190+00	-3.40635690+01	1,12906580+03
7.35000000+01	-2,51764550+00	-3.53244860+01	1,11171880+03
7.39999990+01	-2,50926910+00	-3.65812140+01	1,09374240+03
7.45000000+01	-2,50089270+00	-3.78337540+01	1,07513870+03
7.50000000+01	-2,49251630+00	-3.90821060+01	1,05590970+03
7.55000000+01	-2,48413990+00	-4,03262700+01	1,03605760+03
7.60000000+01	-2,47576340+00	-4,15662460+01	1,01558455+03
7.65000000+01	-2,46738700+00	-4,28020330+01	9,94492500+02
7.70000000+01	-2,45901060+00	-4,40336320+01	9,72783590+02
7.75000000+01	-2,45063420+00	-4,52610430+01	9,50459920+02
7.79999990+01	-2,44225790+00	-4.64842660+01	9,27523600+02
7.85000000+01	-2,43388150+00	-4.77033000+01	9,03976710+02
7.90000000+01	-2,42550510+00	-4.89181470+01	8,79821350+02
7.94999990+01	-2,41712870+00	-5.01288060+01	8,55059620+02
8.00000000+01	-2,40875220+00	-5.13352750+01	8,29693590+02
8.05000000+01	-2,40037580+00	-5.25375570+01	8,03725380+02
8.09999990+01	-2,39199940+00	-5.37356500+01	7,77157090+02
8.15000000+01	-2,38362300+00	-5.49295560+01	7,49990790+02
8.20000000+01	-2,37524660+00	-5.61192740+01	7,22228590+02
8.25000000+01	-2,36687030+00	-5.73048030+01	6,93872560+02

TABLE B-2. (Continued)

8.30000000+01	-2.35849380+00	-5.84861430+01	6.64924840+02
8.34999990+01	-2.35011740+00	-5.96532960+01	6.35387480+02
8.40000000+01	-2.34174100+00	-6.08162610+01	6.05262590+02
8.45000000+01	-2.33336460+00	-6.20050360+01	5.74552280+02
8.49999990+01	-2.32498820+00	-6.31696250+01	5.43258610+02
8.55000000+01	-2.31661190+00	-6.43300240+01	5.11383700+02
8.60000000+01	-2.30823550+00	-6.54862350+01	4.78929640+02
8.64999990+01	-2.29985910+00	-6.66382390+01	4.45898520+02
8.70000000+01	-2.29148270+00	-6.77860930+01	4.12292440+02
8.75000000+01	-2.28310620+00	-6.89297410+01	3.78113480+02
8.80000000+01	-2.27472980+00	-7.00691990+01	3.43363750+02
8.85000000+01	-2.26635340+00	-7.12044690+01	3.08045330+02
8.90000000+01	-2.25797710+00	-7.23355520+01	2.72160330+02
8.95000000+01	-2.24960060+00	-7.34624460+01	2.35710830+02
9.00000000+01	-2.24122420+00	-7.45851520+01	1.98813000+02

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CASE 2
PLANE 2
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	-2.70788790+00	-7.45851520+01	1.98698930+02
9.04999990+01	-2.37677640+00	-7.58563180+01	1.61012050+02
9.10000000+01	-2.05142580+00	-7.69633670+01	1.22844681+02
9.15000000+01	-1.73192164+00	-7.79092030+01	8.41640880+01
9.19999990+01	-1.41812588+00	-7.86967150+01	4.50501570+01
9.25000000+01	-1.11009037+00	-7.93287690+01	5.60152840+00

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CASE 2
PLANE 2
SEGMENT 7

STATION	LOAD	SHEAR	MOMENT
9.25000000+01	-1.11009037+00	8.63517950+00	5.58133520+00
9.30000000+01	-1.11611473+00	8.07862830+00	9.73959230+00
9.34999990+01	-1.12213909+00	7.51906490+00	1.36390155+01
9.40000000+01	-1.12816345+00	6.95648920+00	1.72579040+01
9.45000000+01	-1.13418780+00	6.39090150+00	2.05947510+01
9.50000000+01	-1.14021216+00	5.82230160+00	2.36480520+01
9.55000000+01	-1.14623652+00	5.25068950+00	2.64162990+01
9.60000000+01	-1.15226088+00	4.67606510+00	2.88979880+01
9.65000000+01	-1.15828523+00	4.09842860+00	3.10916110+01
9.70000000+01	-1.16430959+00	3.51778000+00	3.29956640+01
9.74999990+01	-1.17033395+00	2.93411910+00	3.46086380+01
9.80000000+01	-1.17635831+00	2.34744610+00	3.59290290+01
9.85000000+01	-1.18238267+00	1.75776085+00	3.69553310+01
9.89999990+01	-1.18840701+00	1.16506344+00	3.76860370+01
9.95000000+01	-1.19443137+00	5.69353850-01	3.81196400+01
1.00000000+02	-1.20045574+00	-2.93679310-02	3.82748320+01

TABLE B-2. (Continued)

RESULTANT LOADS, CASE 2
SEGMENT 1

STATION	SHEAR	MOMENT
0.00000000	0.00000000	3.10164590-02
6.25000000-01	2.05195580+00	7.09498790-01
1.25000000+00	3.92801220+00	2.59247020+00
1.87500000+00	5.80009040+00	5.64737600+00
2.50000000+00	7.80606390+00	9.91421200+00
3.12500000+00	9.92842060+00	1.54710659+01
3.75000000+00	1.22673591+01	2.24219660+01
4.37500000+00	1.48940035+01	3.09245500+01
5.00000000+00	1.77884250+01	4.11524720+01
5.62500000+00	2.10444550+01	5.33024820+01
6.25000000+00	2.47088970+01	6.76152710+01
6.87500000+00	2.87539470+01	8.43374130+01
7.50000000+00	3.31854370+01	1.03708577+02
8.12500000+00	3.80424690+01	1.25982445+02
8.75000000+00	4.32305430+01	1.51395370+02
9.37500000+00	4.87635890+01	1.80153540+02
1.00000000+01	5.46457030+01	2.12488790+02
1.06250000+01	6.06232590+01	2.48525020+02
1.12500000+01	6.66106140+01	2.88300220+02
1.18750000+01	7.26434950+01	3.31831700+02
1.25000000+01	7.87530460+01	3.79157750+02
1.31250000+01	8.49549350+01	4.30331150+02
1.37500000+01	9.08563050+01	4.85286920+02
1.43750000+01	9.63159230+01	5.43793200+02
1.50000000+01	1.01363965+02	6.05583230+02
1.56250000+01	1.05854643+02	6.70354050+02
1.62499990+01	1.09878958+02	7.37785440+02
1.68750000+01	1.13403250+02	8.07574820+02
1.75000000+01	1.16218842+02	8.79343730+02
1.81250000+01	1.18200173+02	9.52508720+02
1.87500000+01	1.19466429+02	1.02688390+03
1.93749990+01	1.20086950+02	1.10174190+03
2.00000000+01	1.19843535+02	1.17670800+03
2.06250000+01	1.18563108+02	1.25118350+03
2.12500000+01	1.16330365+02	1.32454030+03
2.18750000+01	1.13094629+02	1.39615840+03
2.24999990+01	1.08717031+02	1.46535440+03
2.31250000+01	1.03175207+02	1.53138770+03
2.37500000+01	9.64479910+01	1.59349400+03
2.43750000+01	8.87258060+01	1.65094700+03
2.50000000+01	8.03524110+01	1.70283120+03

SEGMENT 2

STATION	SHEAR	MOMENT
2.50000000+01	8.03524110+01	1.70303240+03
2.53750000+01	7.52104630+01	1.73189190+03
2.57499990+01	7.01248270+01	1.75850290+03
2.61250000+01	6.51148870+01	1.78306180+03
2.64999990+01	6.02062660+01	1.80556360+03
2.68750000+01	5.54332240+01	1.82600420+03
2.72499990+01	5.08420040+01	1.84437950+03
2.76250000+01	4.64953420+01	1.86068590+03
2.79999990+01	4.24781080+01	1.87492060+03
2.83750000+01	3.89031750+01	1.88708090+03

TABLE B-2. (Continued)

2.87499990+01	3.59145080+01	1.89716[illegible]00+03
2.91250000+01	3.36810190+01	1.90517160+03
2.94999990+01	3.23724500+01	1.91110030+03
2.98750000+01	3.21152630+01	1.91495110+03
3.02499990+01	3.29469800+01	1.91672540+03
3.06250000+01	3.48018460+01	1.91642520+03
3.09999990+01	3.75398680+01	1.91405400+03
3.13750000+01	4.07949240+01	1.90961610+03
3.17500000+01	4.50117680+01	1.90311770+03
3.21250000+01	4.94624770+01	1.89456630+03
3.25000000+01	5.[illegible]2483950+01	1.88397150+03
3.28750000+01	5.92[illegible]57910+01	1.87134470+03
3.32500000+01	[illegible].[illegible]5501700+01	1.85669990+03
3.36250000+01	6.[illegible]9712330+01	1.84005390+03
3.40000000+01	7.55289750+01	1.82142630+03
3.43750000+01	8.12008280+01	1.80084070+03
3.47500000+01	8.69696190+01	1.77832490+03
3.51250000+01	9.28221260+01	1.75391120+03
3.55000000+01	9.87480400+01	1.72763800+03
3.58749990+01	1.04739236+02	1.69955000+03
3.62500000+01	1.10789240+02	1.66969980+03
3.66249990+01	1.16892839+02	1.63814910+03
3.70000000+01	1.23045795+02	1.60497050+03
3.73749990+01	1.29244630+02	1.57024910+03
3.77500000+01	1.35486470+02	1.53408550+03
3.81249990+01	1.41768930+02	1.49659800+03
3.85000000+01	1.48089980+02	1.45792690+03
3.88749990+01	1.54447950+02	1.41823780+03
3.92500000+01	1.60841380+02	1.37772750+03
3.96249990+01	1.67269020+02	1.33662990+03
4.00000000+01	1.73729840+02	1.29499430+03

SEGMENT 3

STATION	SHEAR	MOMENT
4.00000000+01	3.01202630+02	3.23355720+03
4.04999990+01	2.92469940+02	3.36112620+03
4.10000000+01	2.83704200+02	3.48590990+03
4.15000000+01	2.74906410+02	3.60791300+03
4.19999990+01	2.66077720+02	3.72689240+03
4.25000000+01	2.57219440+02	3.84264100+03
4.30000000+01	2.48333080+02	3.95498120+03
4.34999990+01	2.39420410+02	4.06375940+03
4.40000000+01	2.30483460+02	4.16884140+03
4.45000000+01	2.21524630+02	4.27010950+03
4.50000000+01	2.12546740+02	4.36745940+03
4.55000000+01	2.03553140+02	4.46079810+03
4.59999990+01	1.94547820+02	4.55004200+03
4.65000000+01	1.85535570+02	4.63511580+03
4.70000000+01	1.76522180+02	4.71595060+03
4.74999990+01	1.67514780+02	4.79248360+03
4.80000000+01	1.58522080+02	4.86465720+03
4.85000000+01	1.49555000+02	4.93241760+03
4.89999990+01	1.40627220+02	4.99571510+03
4.95000000+01	1.31756170+02	5.05450320+03
5.00000000+01	1.23367041+02	5.10856430+03

TABLE B-2. (Continued)

SEGMENT 4

STATION	SHEAR	MOMENT
5.00000000+01	1.23367041+02	5.10880600+03
5.05000000+01	1.15865737+02	5.15919880+03
5.10000000+01	1.08850783+02	5.20553740+03
5.14999990+01	1.01946379+02	5.24809720+03
5.20000000+01	9.51867690+01	5.28684590+03
5.25000000+01	8.86160900+01	5.32175240+03
5.29999990+01	8.22915160+01	5.35278690+03
5.35000000+01	7.62872030+01	5.37992050+03
5.40000000+01	7.06988190+01	5.40312540+03
5.44999990+01	6.56478550+01	5.42237510+03
5.50000000+01	6.12837010+01	5.43764350+03
5.55000000+01	5.77796530+01	5.44890560+03
5.59999990+01	5.53177410+01	5.45613710+03
5.65000000+01	5.40593830+01	5.45931440+03
5.70000000+01	5.41075360+01	5.45841480+03
5.75000000+01	5.54773140+01	5.45341610+03
5.80000000+01	5.80930480+01	5.44429700+03
5.84999990+01	6.18135120+01	5.43103690+03
5.90000000+01	6.64691110+01	5.41361580+03
5.95000000+01	7.18929470+01	5.39201450+03
5.99999990+01	7.79382880+01	5.36621450+03
6.05000000+01	8.44843390+01	5.33619810+03
6.10000000+01	9.14352440+01	5.30194880+03
6.14999990+01	9.87163460+01	5.26345030+03
6.20000000+01	1.06269903+02	5.22068790+03
6.25000000+01	1.14051261+02	5.17364770+03
6.30000000+01	1.22025740+02	5.12231680+03
6.35000000+01	1.30166230+02	5.06668400+03
6.40000000+01	1.38451350+02	5.00673910+03
6.45000000+01	1.46864150+02	4.94247380+03
6.50000000+01	1.55390990+02	4.87388150+03
6.54999990+01	1.64020870+02	4.80095770+03
6.60000000+01	1.72744820+02	4.72370030+03
6.65000000+01	1.81555450+02	4.64211000+03
6.69999990+01	1.90446670+02	4.55619060+03
6.75000000+01	1.99413360+02	4.46594960+03
6.80000000+01	2.08451260+02	4.37139910+03
6.84999990+01	2.17556740+02	4.27255620+03
6.90000000+01	2.26726730+02	4.16944440+03
6.95000000+01	2.35958600+02	4.06209450+03
7.00000000+01	2.45250090+02	3.95036440+03

SEGMENT 5

STATION	SHEAR	MOMENT
7.00000000+01	5.18421900+01	3.95054620+03
7.05000000+01	4.47528730+01	3.96556380+03
7.09999990+01	3.87019100+01	3.97577640+03
7.15000000+01	3.42785370+01	3.98133470+03
7.20000000+01	3.21981650+01	3.98220840+03
7.24999990+01	3.29442100+01	3.97836810+03
7.30000000+01	3.63757890+01	3.96978540+03
7.35000000+01	4.18658110+01	3.95643250+03
7.39999990+01	4.87480150+01	3.93828210+03
7.45000000+01	5.65374290+01	3.91530780+03

TABLE B-2. (Continued)

7.50000000+01	6.49269340+01	3.88748330+03
7.55000000+01	7.37284360+01	3.85478300+03
7.60000000+01	8.28254390+01	3.81718170+03
7.65000000+01	9.21437830+01	3.77465460+03
7.70000000+01	1.01634734+02	3.72717720+03
7.75000000+01	1.11265267+02	3.67472510+03
7.79999990+01	1.21012337+02	3.61727450+03
7.85000000+01	1.30859460+02	3.55480190+03
7.90000000+01	1.40794540+02	3.48728370+03
7.94999990+01	1.50808570+02	3.41469690+03
8.00000000+01	1.60894650+02	3.33701840+03
8.05000000+01	1.71047490+02	3.25422550+03
8.09999990+01	1.81262890+02	3.16629560+03
8.15000000+01	1.91537540+02	3.07320640+03
8.20000000+01	2.01868770+02	2.97493570+03
8.25000000+01	2.12254390+02	2.87146150+03
8.30000000+01	2.22692630+02	2.76276190+03
8.34999990+01	2.33182010+02	2.64881570+03
8.40000000+01	2.43721280+02	2.52960140+03
8.45000000+01	2.54309410+02	2.40509810+03
8.49999990+01	2.64945510+02	2.27528520+03
8.55000000+01	2.75628840+02	2.14014270+03
8.60000000+01	2.86358750+02	2.00266290+03
8.64999990+01	2.97134690+02	1.86905470+03
8.70000000+01	3.07956160+02	1.72977770+03
8.75000000+01	3.18822760+02	1.58362290+03
8.80000000+01	3.29734120+02	1.43098160+03
8.85000000+01	3.40689910+02	1.27184520+03
8.90000000+01	3.51689850+02	1.10620480+03
8.95000000+01	3.62733700+02	9.34051990+02
9.00000000+01	3.73821230+02	7.55490040+02

SEGMENT 6

STATION	SHEAR	MOMENT
9.00000000+01	3.73821230+02	7.55378050+02
9.04999990+01	3.85360320+02	5.70036870+02
9.10000000+01	3.95225040+02	3.78652160+02
9.15000000+01	4.03409300+02	1.82118010+02
9.19999990+01	4.09907200+02	1.28821750+02
9.25000000+01	4.14712870+02	3.23185970+02

SEGMENT 7

STATION	SHEAR	MOMENT
9.25000000+01	6.66831430+01	3.23145240+02
9.30000000+01	6.23889960+01	2.93308730+02
9.34999990+01	5.80716490+01	2.65563700+02
9.40000000+01	5.37311020+01	2.39890680+02
9.45000000+01	4.93673560+01	2.16310930+02
9.50000000+01	4.49804120+01	1.94844900+02
9.55000000+01	4.05702670+01	1.75510820+02
9.60000000+01	3.61369220+01	1.58322510+02
9.65000000+01	3.16803790+01	1.43286330+02
9.70000000+01	2.72006350+01	1.30397410+02
9.74999990+01	2.26976910+01	1.19635885+02
9.80000000+01	1.81715470+01	1.10964570+02
9.85000000+01	1.36222025+01	1.04330337+02
9.89999990+01	9.04965830+00	9.96710560+01
9.95000000+01	4.45391360+00	9.69284000+01
1.00000000+02	1.65062890-01	9.61087640+01

TABLE B-2. (Continued)

ENVELOPE OF MAXIMUM LOADS
SEGMENT 1

STATION	SHEAR	MOMENT
0.00000000	0.00000000	3.10164590-02
6.25000000-01	2.05195580+00	7.09498790-01
1.25000000+00	3.92801220+00	2.59247020+00
1.87500000+00	5.80009040+00	5.64737600+00
2.50000000+00	7.80606390+00	9.91421200+00
3.12500000+00	9.92842060+00	1.54710659+01
3.75000000+00	1.22673591+01	2.24219660+01
4.37500000+00	1.48940035+01	3.09245500+01
5.00000000+00	1.77684250+01	4.11524720+01
5.62500000+00	2.10444550+01	5.33024820+01
6.25000000+00	2.47088970+01	6.76152710+01
6.87500000+00	2.87539470+01	8.43374130+01
7.50000000+00	3.31854370+01	1.03708577+02
8.12500000+00	3.80424690+01	1.25982445+02
8.75000000+00	4.32305430+01	1.51395370+02
9.37500000+00	4.87635890+01	1.80158540+02
1.00000000+01	5.46457030+01	2.12488790+02
1.06250000+01	6.06232590+01	2.48525020+02
1.12500000+01	6.66106140+01	2.88300220+02
1.18750000+01	7.26434950+01	3.31831700+02
1.25000000+01	7.87530460+01	3.79157750+02
1.31250000+01	8.49549350+01	4.30331150+02
1.37500000+01	9.08563050+01	4.85286920+02
1.43750000+01	9.63159230+01	5.43793200+02
1.50000000+01	1.01363965+02	6.05583230+02
1.56250000+01	1.05854643+02	6.70354050+02
1.62499990+01	1.09878958+02	7.37785440+02
1.68750000+01	1.13403250+02	8.07574820+02
1.75000000+01	1.16218842+02	8.79343730+02
1.81250000+01	1.18200173+02	9.52608720+02
1.87500000+01	1.19466429+02	1.02688390+03
1.93749990+01	1.20086950+02	1.10174190+03
2.00000000+01	1.19843535+02	1.17670800+03
2.06250000+01	1.18563108+02	1.25118350+03
2.12500000+01	1.[illegible]330365+02	1.32454030+03
2.18750000+01	1.13094629+02	1.39615840+03
2.24999990+01	1.08717031+02	1.46535440+03
2.31250000+01	1.03175207+02	1.53138770+03
2.37500000+01	9.64479910+01	1.59349400+03
2.43750000+01	8.93119210+01	1.65094700+03
2.50000000+01	1.05597339+02	1.70283120+03

SEGMENT 2

STATION	SHEAR	MOMENT
2.50000000+01	1.05597339+02	1.70303240+03
2.53750000+01	1.15652358+02	1.73189190+03
2.57499990+01	1.25741639+02	1.75850290+03
2.61250000+01	1.35859280+02	1.78306180+03
2.64999990+01	1.46001120+02	1.80556360+03
2.68750000+01	1.56164000+02	1.82600420+03
2.72499990+01	1.66345570+02	1.84437950+03
2.76250000+01	1.76543990+02	1.86068590+03
2.79999990+01	1.86757820+02	1.87492060+03
2.83750000+01	1.96985930+02	1.88708090+03

TABLE B-2. (Continued)

2.87499990+01	2.07227400+02	1.89716500+03
2.91250000+01	2.17481490+02	1.90517160+03
2.94999990+01	2.27747570+02	1.91110030+03
2.98750000+01	2.38025160+02	1.91495110+03
3.02499990+01	2.48313800+02	1.91672540+03
3.06250000+01	2.58613150+02	1.91642520+03
3.09999990+01	2.68922920+02	1.91405400+03
3.13750000+01	2.79242830+02	1.90961610+03
3.17500000+01	2.89572660+02	1.90311770+03
3.21250000+01	2.99912230+02	1.89456630+03
3.25000000+01	3.10261360+02	1.88397150+03
3.28750000+01	3.20619910+02	1.87134470+03
3.32500000+01	3.30987750+02	1.85669990+03
3.36250000+01	3.41364770+02	1.95318910+03
3.40000000+01	3.51750870+02	2.08160530+03
3.43750000+01	3.62145970+02	2.21402730+03
3.47500000+01	3.72549980+02	2.35044660+03
3.51250000+01	3.82962830+02	2.49085640+03
3.55000000+01	3.93384460+02	2.63525110+03
3.58749990+01	4.03814820+02	2.78362650+03
3.62500000+01	4.14253860+02	2.93597900+03
3.66249990+01	4.24701530+02	3.09230600+03
3.70000000+01	4.35157780+02	3.25260530+03
3.73749990+01	4.45622580+02	3.41687600+03
3.77500000+01	4.56095900+02	3.58511690+03
3.81249990+01	4.66577700+02	3.75732760+03
3.85000000+01	4.77067960+02	3.93350810+03
3.88749990+01	4.87566660+02	4.11365850+03
3.92500000+01	4.98073760+02	4.29777960+03
3.96249990+01	5.08589250+02	4.48587220+03
4.00000000+01	5.19113090+02	4.67783490+03

SEGMENT 3

STATION	SHEAR	MOMENT
4.00000000+01	8.68411890+02	4.67797110+03
4.04999990+01	8.54362340+02	4.24930670+03
4.10000000+01	8.40298820+02	3.82789360+03
4.15000000+01	8.26221380+02	3.60791300+03
4.19999990+01	8.12130000+02	3.72689240+03
4.25000000+01	7.98024710+02	3.84264100+03
4.30000000+01	7.83905540+02	3.95498120+03
4.34999990+01	7.69772500+02	4.06375940+03
4.40000000+01	7.55625640+02	4.16884140+03
4.45000000+01	7.41464950+02	4.27010950+03
4.50000000+01	7.27290510+02	4.36745940+03
4.55000000+01	7.13102310+02	4.46079810+03
4.59999990+01	6.98900400+02	4.55004200+03
4.65000000+01	6.84684840+02	4.63511580+03
4.70000000+01	6.70455630+02	4.71595060+03
4.74999990+01	6.56212850+02	4.79248360+03
4.80000000+01	6.41956550+02	4.86465720+03
4.85000000+01	6.27686750+02	4.93241760+03
4.89999990+01	6.13403540+02	4.99571510+03
4.95000000+01	5.99106970+02	5.05450320+03
5.00000000+01	5.85431350+02	5.10856430+03

TABLE B-2. (Continued)

SEGMENT 4

STATION	SHEAR	MOMENT
5.00000000+01	5.85431350+02	5.10880600+03
5.05000000+01	5.73009630+02	5.15919880+03
5.10000000+01	5.61206680+02	5.20553740+03
5.14999990+01	5.49388590+02	5.24809720+03
5.20000000+01	5.37555430+02	5.28684590+03
5.25000000+01	5.25707270+02	5.32175240+03
5.29999990+01	5.13844180+02	5.35278690+03
5.35000000+01	5.01966240+02	5.37992050+03
5.40000000+01	4.90073520+02	5.40312540+03
5.44999990+01	4.78166140+02	5.42237510+03
5.50000000+01	4.66244180+02	5.43764350+03
5.55000000+01	4.54307770+02	5.47746060+03
5.59999990+01	4.42357050+02	5.70078730+03
5.65000000+01	4.30392140+02	5.91818400+03
5.70000000+01	4.18413210+02	6.12963520+03
5.75000000+01	4.06420650+02	6.33512680+03
5.80000000+01	3.94414060+02	6.53464590+03
5.84999990+01	3.82394260+02	6.72817990+03
5.90000000+01	3.70361310+02	6.91571750+03
5.95000000+01	3.58315520+02	7.09724780+03
5.99999990+01	3.46237200+02	7.27276030+03
6.05000000+01	3.34186760+02	7.44224490+03
6.10000000+01	3.22104630+02	7.60569190+03
6.14999990+01	3.10011340+02	7.76309190+03
6.20000000+01	2.97907480+02	7.91443590+03
6.25000000+01	2.85793760+02	8.05971470+03
6.30000000+01	2.73670990+02	8.19891940+03
6.35000000+01	2.61540180+02	8.33204190+03
6.40000000+01	2.49402520+02	8.45907310+03
6.45000000+01	2.37259400+02	8.58000510+03
6.50000000+01	2.25112570+02	8.69482980+03
6.54999990+01	2.12964170+02	8.80353890+03
6.60000000+01	2.00816850+02	8.90612450+03
6.65000000+01	1.88673970+02	9.00257870+03
6.69999990+01	1.90446670+02	9.09289370+03
6.75000000+01	1.99413360+02	9.17706180+03
6.80000000+01	2.08451260+02	9.25507570+03
6.84999990+01	2.17556740+02	9.32692740+03
6.90000000+01	2.26726730+02	9.39260980+03
6.95000000+01	2.35958600+02	9.45211560+03
7.00000000+01	2.45250090+02	9.50555120+03

SEGMENT 5

STATION	SHEAR	MOMENT
7.00000000+01	1.48550510+02	3.95054620+03
7.05000000+01	1.36239130+02	3.96556380+03
7.09999990+01	1.23938889+02	3.97577640+03
7.15000000+01	1.11658824+02	3.98133470+03
7.20000000+01	9.94124550+01	3.98220840+03
7.24999990+01	8.72208640+01	3.97836810+03
7.30000000+01	7.51187350+01	3.96978540+03
7.35000000+01	6.31670530+01	3.95643250+03
7.39999990+01	5.14824430+01	3.93828210+03

TABLE B-2. (Continued)

7.45000000+01	5.65374290+01	3.91530780+03
7.50000000+01	6.49269340+01	3.88748330+03
7.55000000+01	7.37284360+01	3.85478300+03
7.60000000+01	8.28254390+01	3.81718170+03
7.65000000+01	9.21437830+01	3.77465460+03
7.70000000+01	1.01634734+02	3.72717720+03
7.75000000+01	1.11265267+02	3.67472510+03
7.79999990+01	1.21012337+02	3.61727450+03
7.85000000+01	1.30859460+02	3.55480190+03
7.90000000+01	1.40794540+02	3.48728370+03
7.94999990+01	1.50808570+02	3.41469690+03
8.00000000+01	1.60894650+02	3.33701840+03
8.05000000+01	1.71047490+02	3.25422550+03
8.09999990+01	1.81262890+02	3.16629560+03
8.15000000+01	1.91537540+02	3.07320640+03
8.20000000+01	2.01868770+02	2.97493570+03
8.25000000+01	2.12254390+02	2.87146150+03
8.30000000+01	2.22692630+02	2.76276190+03
8.34999990+01	2.33182010+02	2.64881570+03
8.40000000+01	2.43721280+02	2.52960140+03
8.45000000+01	2.54309410+02	2.40509810+03
8.49999990+01	2.64945510+02	2.27528520+03
8.55000000+01	2.75628840+02	2.14014270+03
8.60000000+01	2.86358750+02	1.99965130+03
8.64999990+01	2.97134690+02	1.85379250+03
8.70000000+01	3.07956160+02	1.70254950+03
8.75000000+01	3.18822760+02	1.54590780+03
8.80000000+01	3.29734120+02	1.38385650+03
8.85000000+01	3.40689910+02	1.21639150+03
8.90000000+01	3.51689850+02	1.04352160+03
8.95000000+01	3.62733700+02	8.65282480+02
9.00000000+01	3.73821230+02	6.81590560+02

TABLE B-2. (Continued)

SEGMENT 6

STATION	SHEAR	MOMENT
9.00000000+01	3.73821230+02	6.81775510+02
9.04999990+01	3.85360320+02	4.93315880+02
9.10000000+01	3.95225040+02	3.01058270+02
9.15000000+01	4.03409300+02	1.15371654+02
9.19999990+01	4.09907200+02	1.28821750+02
9.25000000+01	4.14712870+02	3.23185970+02

SEGMENT 7

STATION	SHEAR	MOMENT
9.25000000+01	6.23888810+01	3.23145240+02
9.30000000+01	5.84116270+01	2.93308730+02
9.34999990+01	5.44068110+01	2.65563700+02
9.40000000+01	5.03744350+01	2.39890680+02
9.45000000+01	4.63144970+01	2.16310930+02
9.50000000+01	4.22269990+01	1.94844900+02
9.55000000+01	3.81119390+01	1.75510820+02
9.60000000+01	3.39693170+01	1.58322510+02
9.65000000+01	2.97991350+01	1.43286330+02
9.70000000+01	2.56013910+01	1.30397410+02
9.74999990+01	2.13760850+01	1.19635885+02
9.80000000+01	1.71232160+01	1.10964570+02
9.85000000+01	1.28427870+01	1.04330337+02
9.89999990+01	8.53479560+00	9.96710560+01
9.95000000+01	4.19924420+00	9.69284000+01
1.00000000+02	1.64026250-01	9.61087640+01

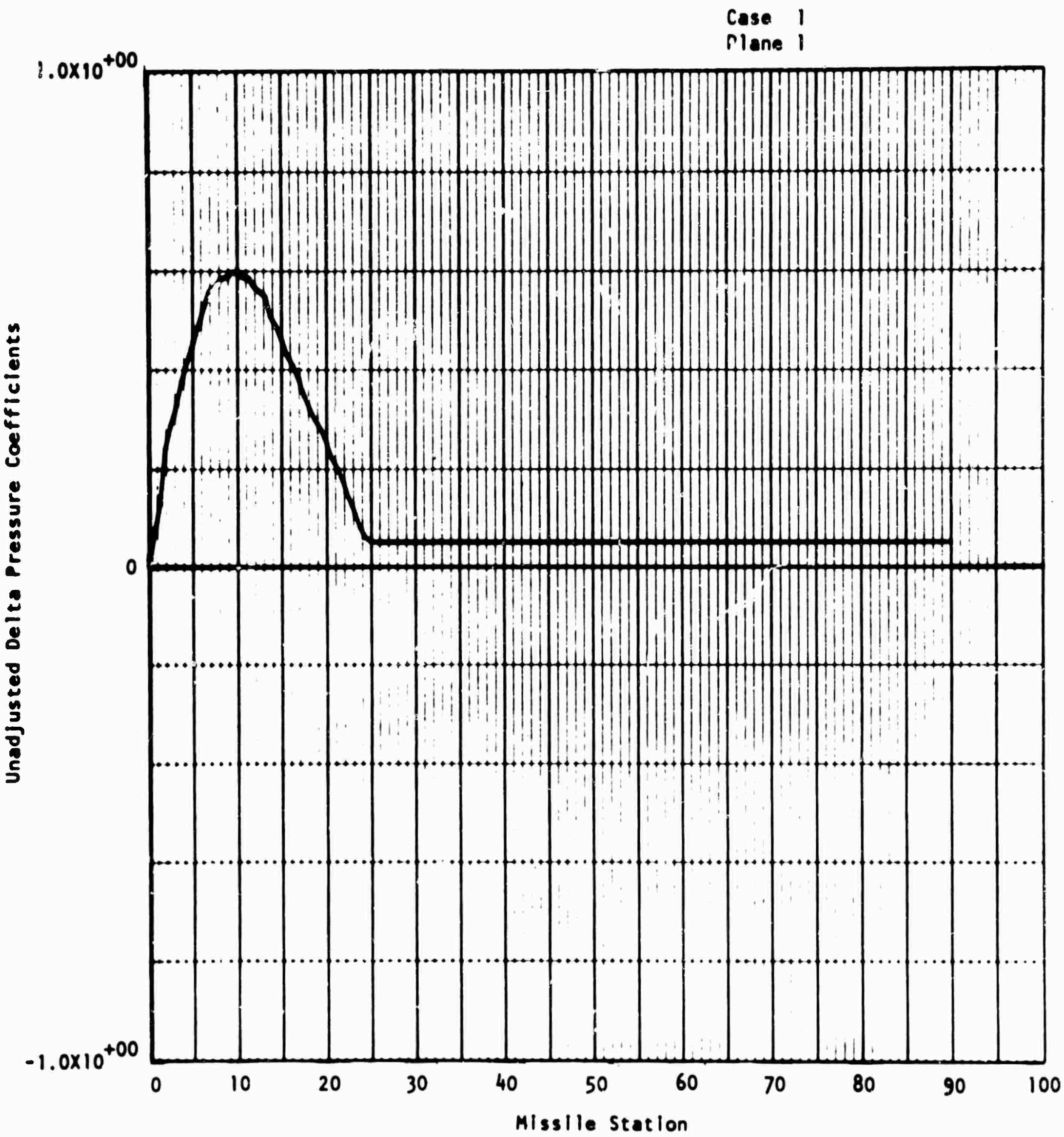
Case 1
Plane 1
1.0X10+00
0
-1.0X10+00
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(a).

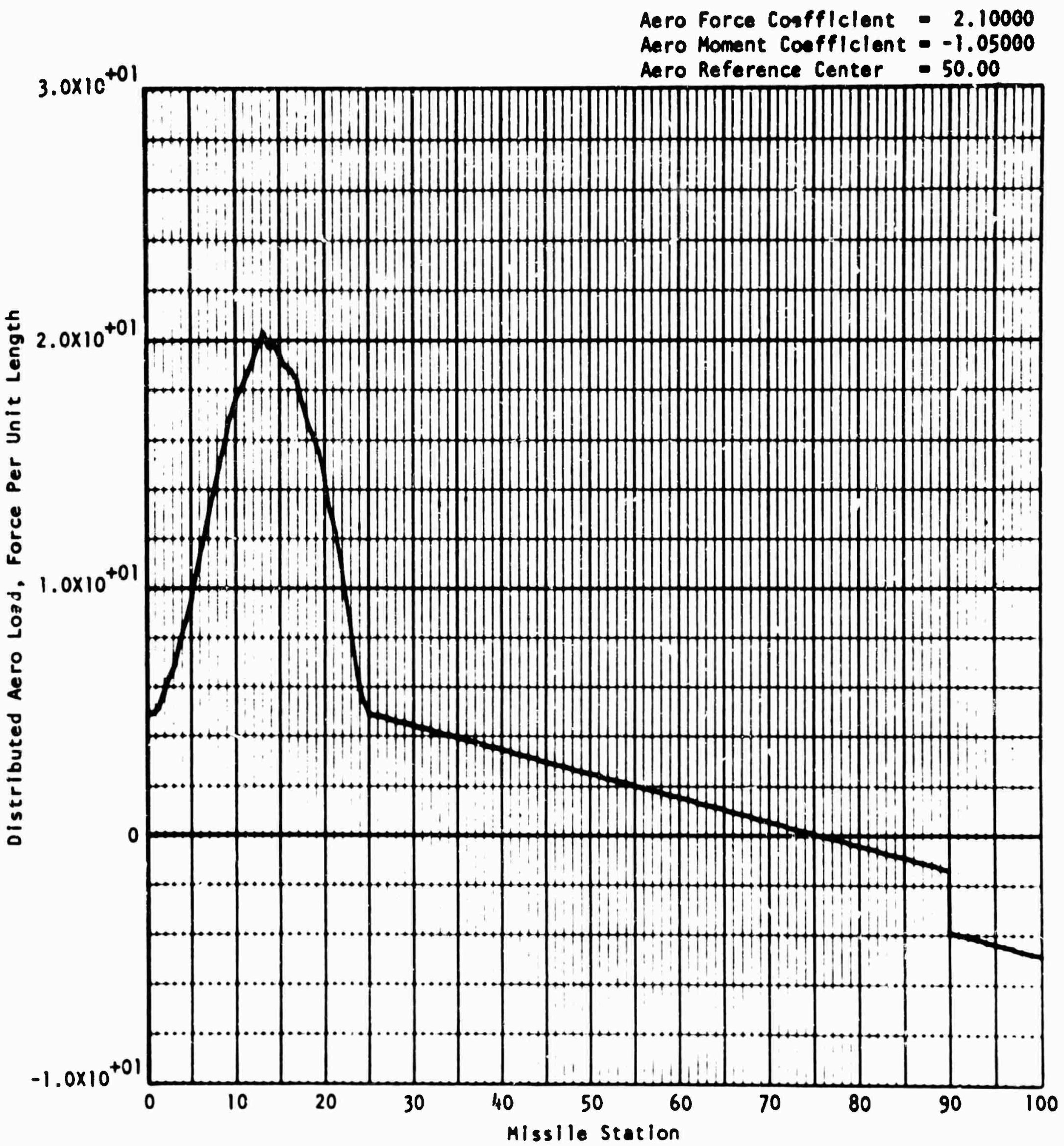
Aero Force Coefficient = 2.10000
Aero Moment Coefficient = -1.05000
Aero Reference Center = 50.00
3.0X10+01
2.0X10+01
1.0X10+01
0
-1.0X10+01
Distributed Aero Load, Force Per Unit Length
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(b).

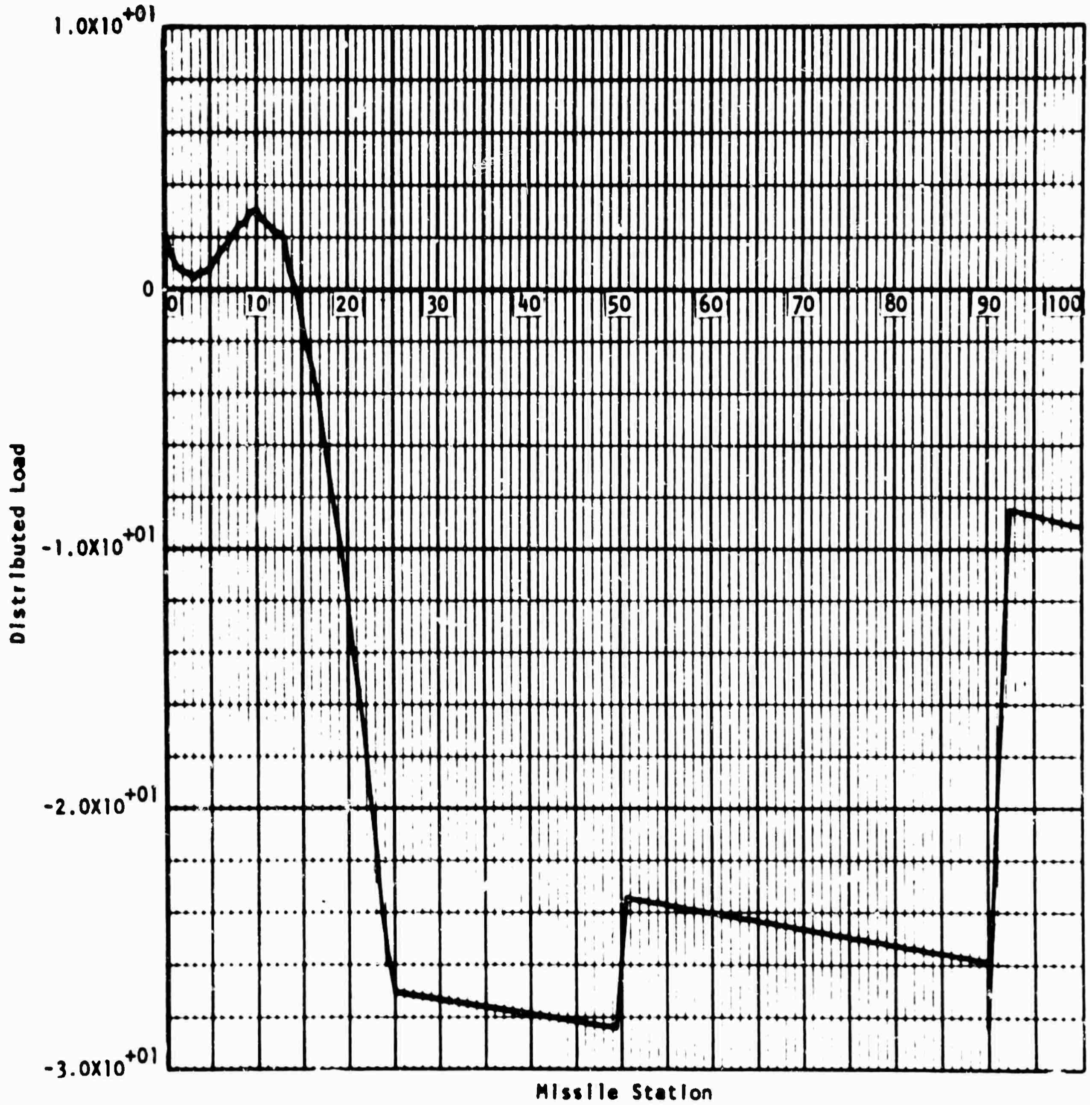
1.0X10+01
0
-1.0X10+01
-2.0X10+01
-3.0X10+01
Distributed Load
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(c).

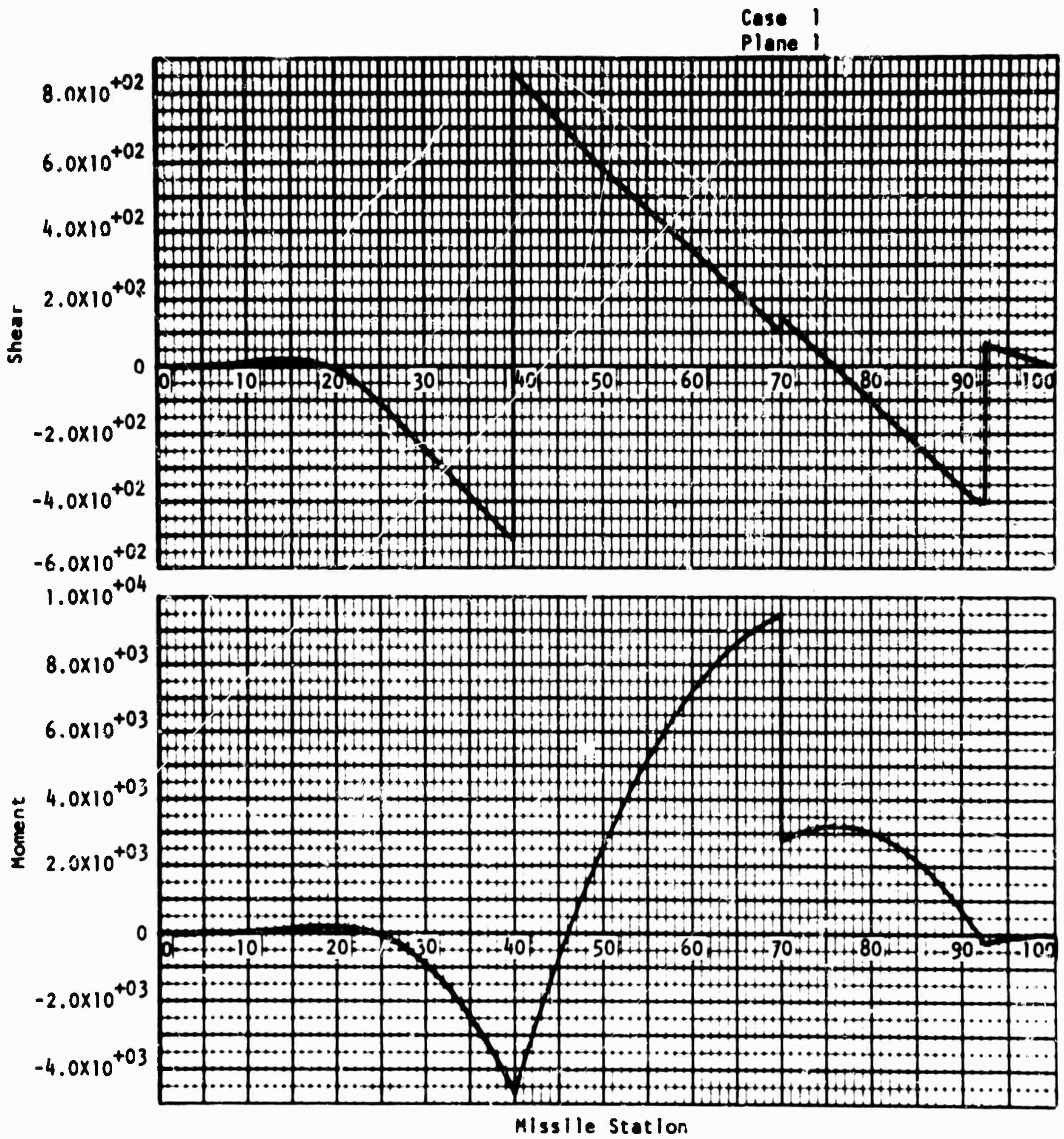
Case 1
Plane 1
Shear
8.0X10+02
6.0X10+02
4.0X10+02
2.0X10+02
0
-2.0X10+02
-4.0X10+02
-6.0X10+02
0
10
20
30
40
50
60
70
80
90
100
Moment
1.0X10+04
8.0X10+03
6.0X10+03
4.0X10+03
2.0X10+03
0
-2.0X10+03
-4.0X10+03
Missile Station

FIG. B-2(d).

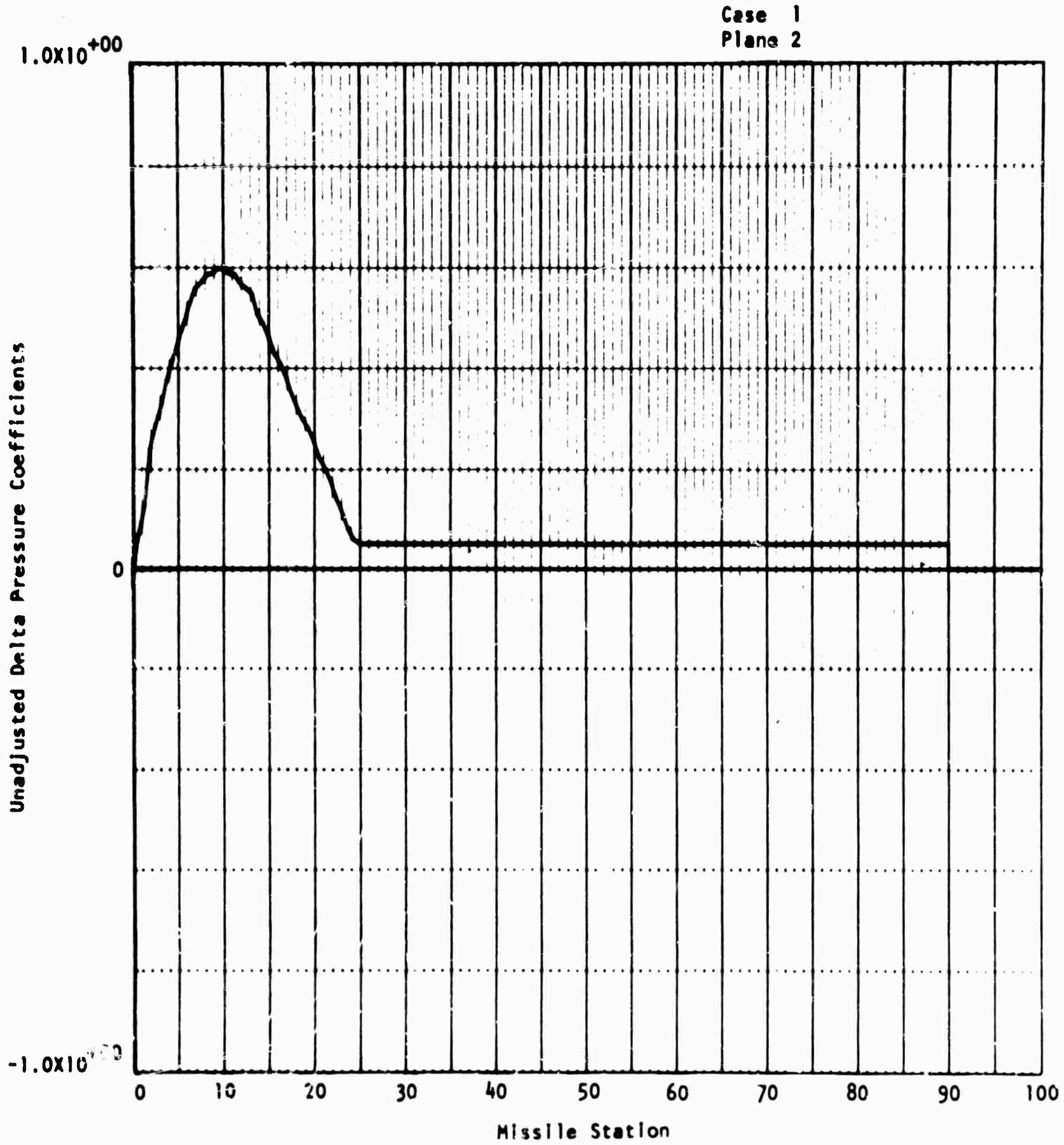
Case 1
Plane 2
1.0X10+00
0
-1.0X10
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(e).

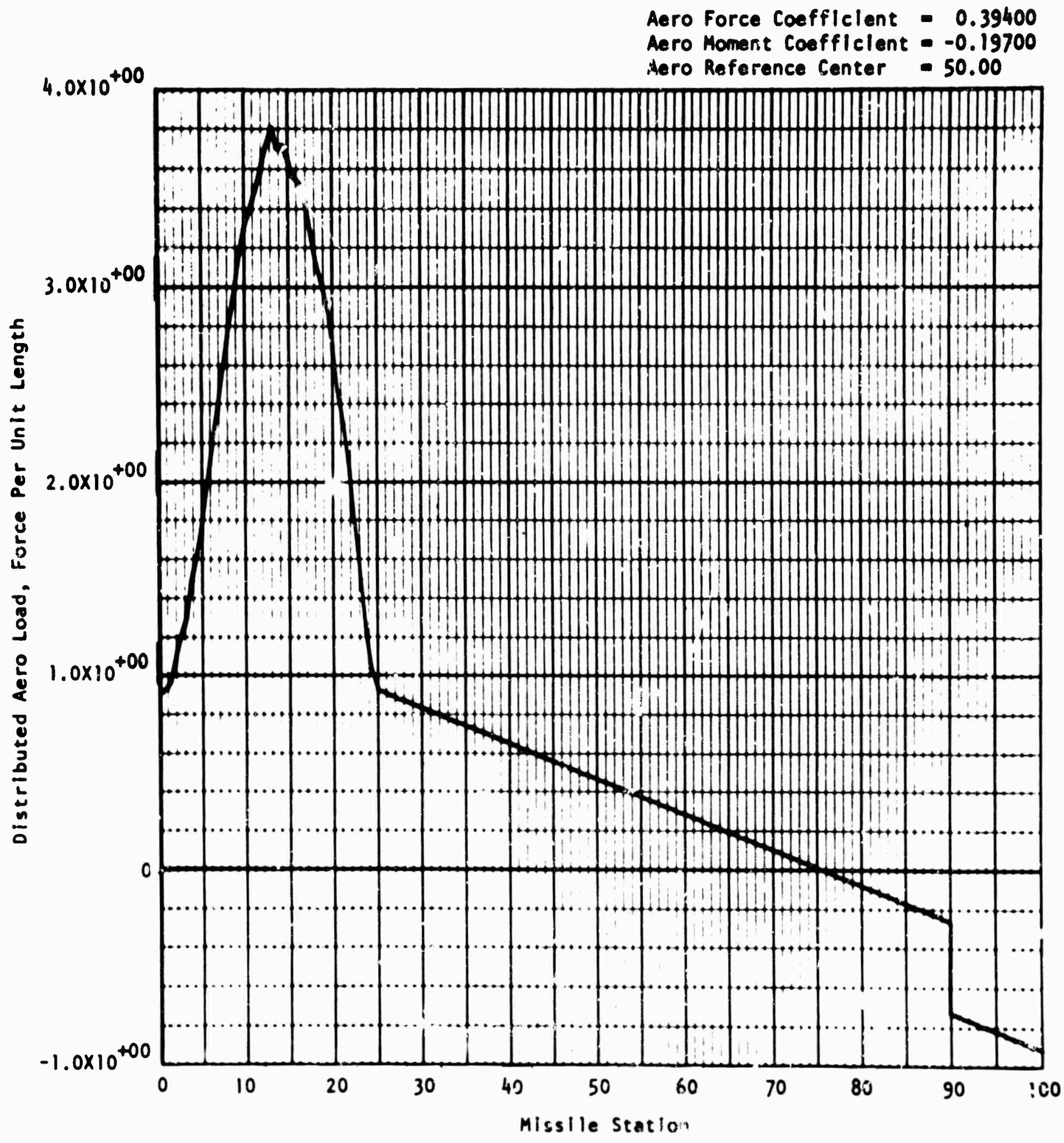
Aero Force Coefficient = 0.39400
Aero Moment Coefficient = -0.19700
Aero Reference Center = 50.00
4.0X10+00
3.0X10+00
2.0X10+00
1.0X10+00
0
-1.0X10+00
Distributed Aero Load, Force Per Unit Length
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(f).

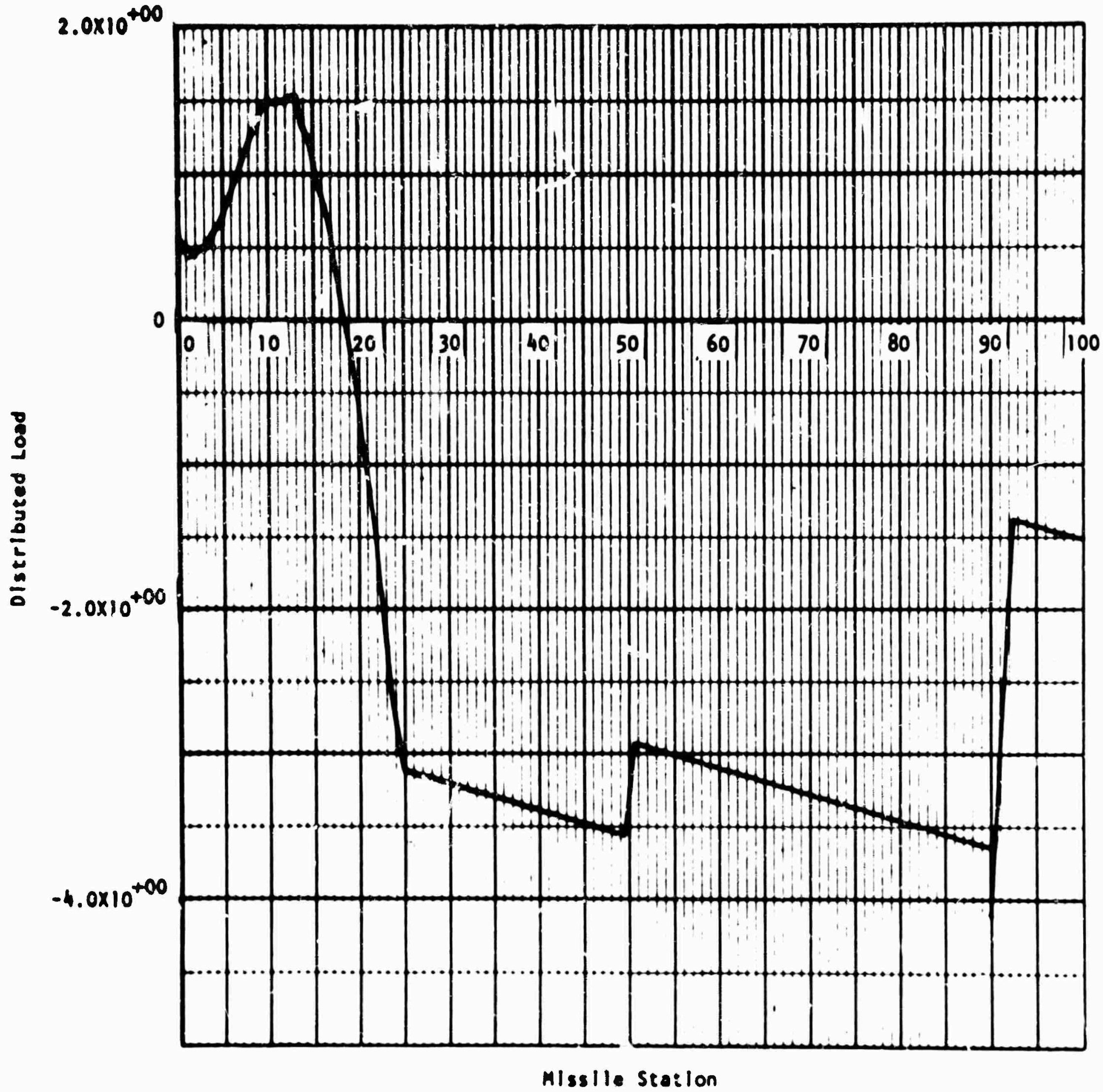
2.0X10+00
0
-2.0X10+00
-4.0X10+00
Distributed Load
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(g).

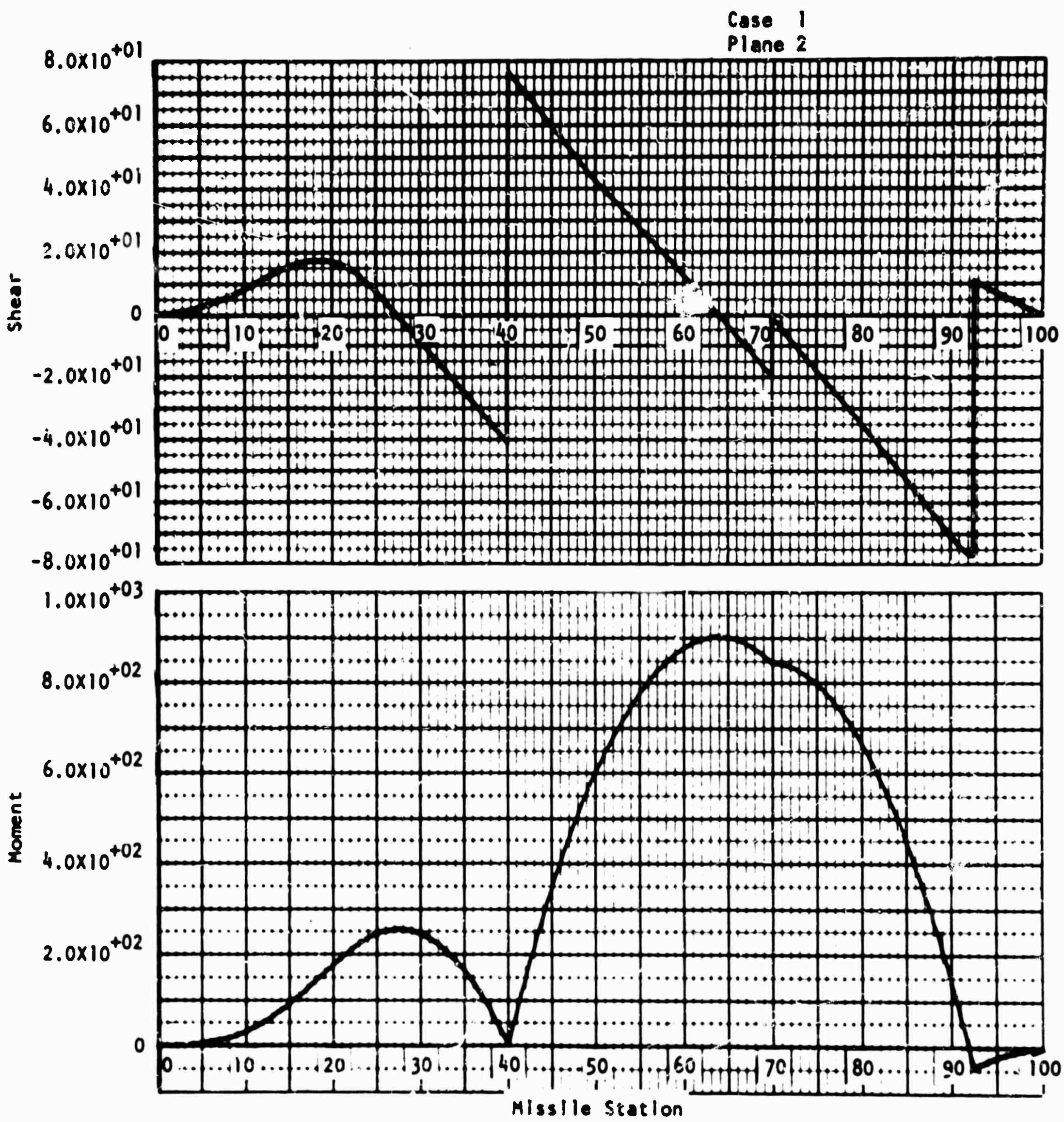
Case 1
Plane 2
8.0X10+01
6.0X10+01
4.0X10+01
2.0X10+01
0
-2.0X10+01
-4.0X10+01
-6.0X10+01
-8.0X10+01
Shear
0
10
20
30
40
50
60
70
80
90
100
1.0X10+03
8.0X10+02
6.0X10+02
4.0X10+02
2.0X10+02
0
Moment
Missile Station

FIG. B-2(h).

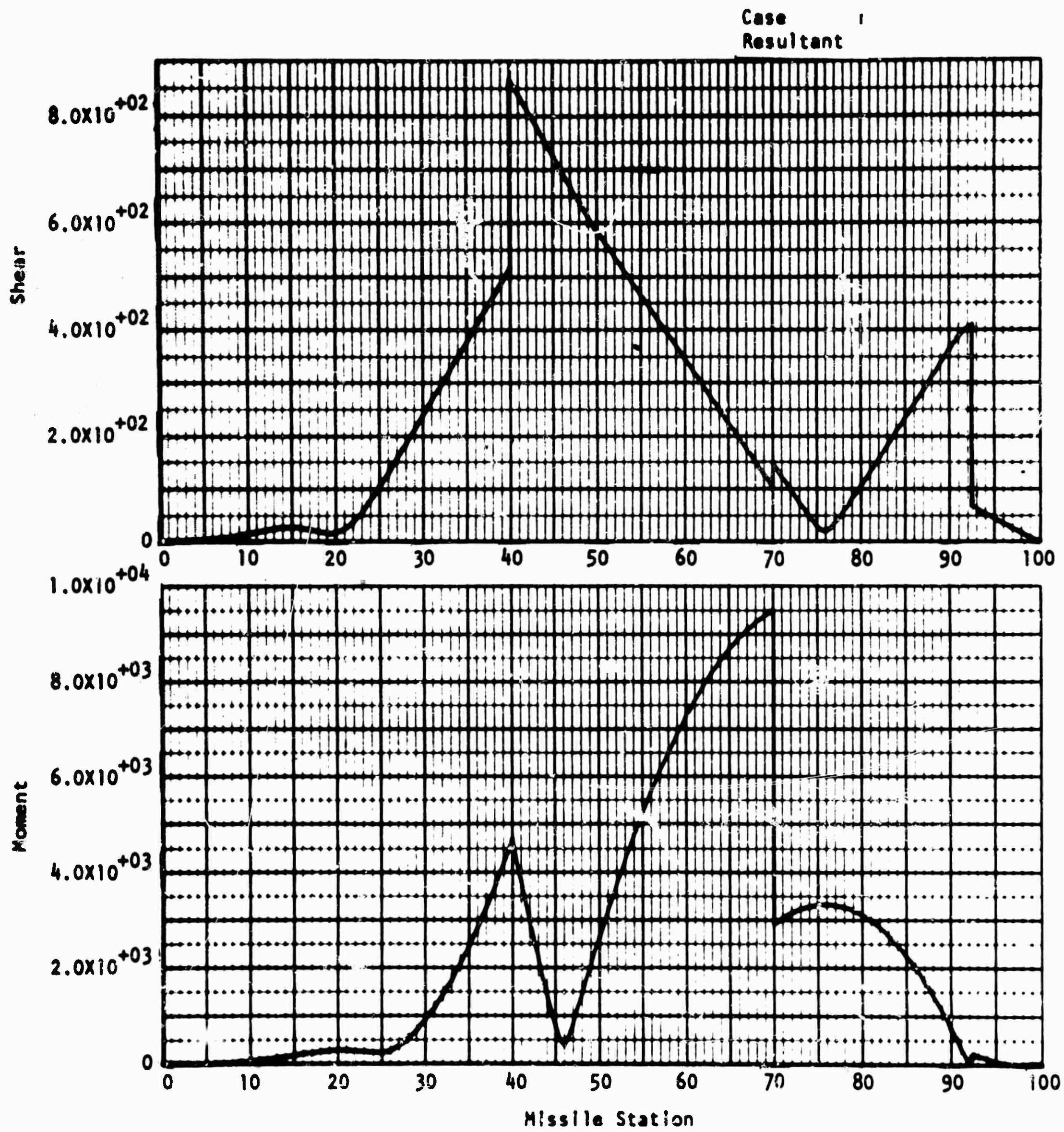
Case I
Resultant
Shear
8.0X10+02
6.0X10+02
4.0X10+02
2.0X10+02
0
0 10 20 30 40 50 60 70 80 90 100
1.0X10+04
8.0X10+03
6.0X10+03
4.0X10+03
2.0X10+03
Moment
Missile Station

FIG. B-2(i).

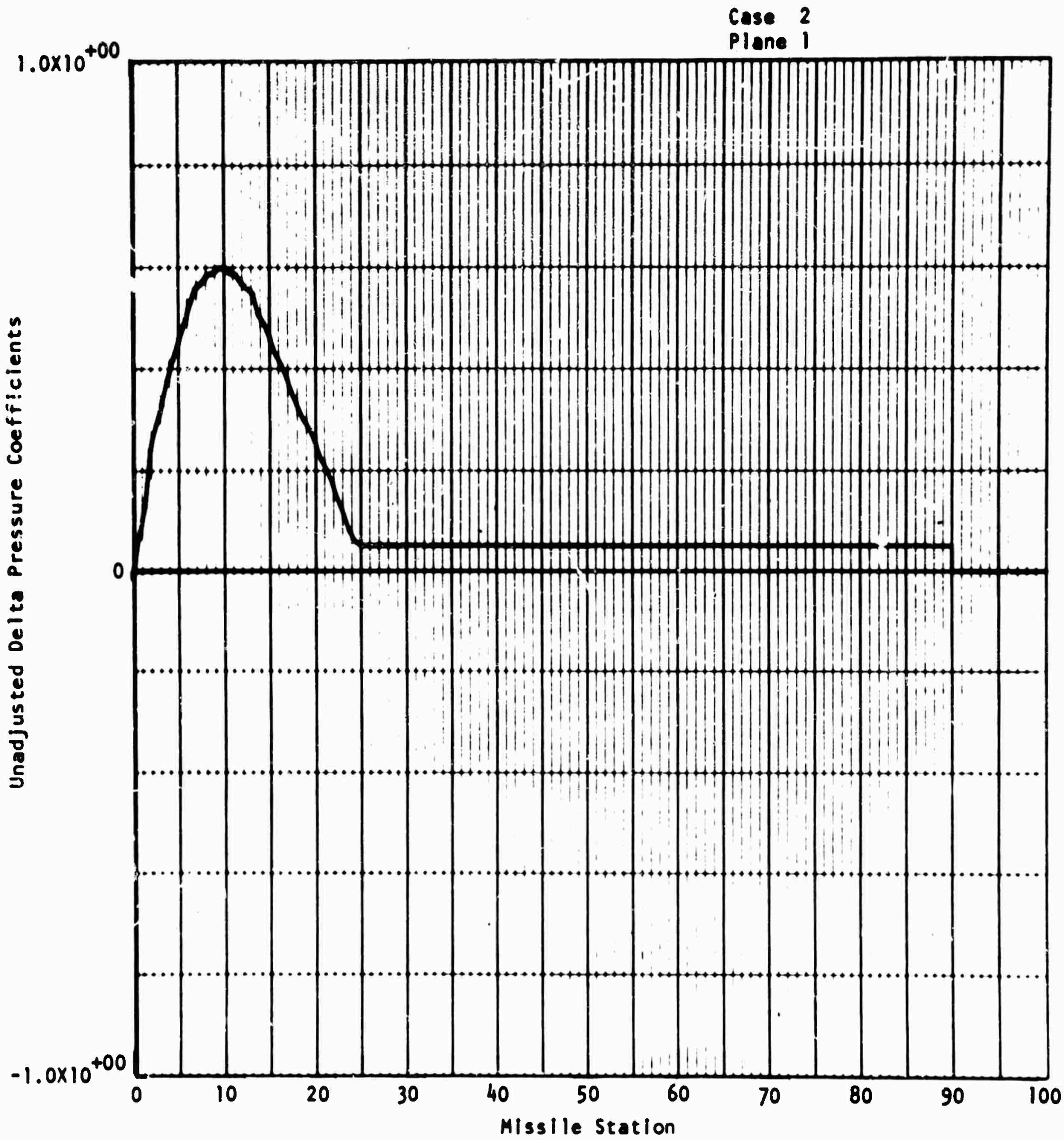
Case 2
Plane 1
1.0X10+00
0
-1.0X10+00
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(j).

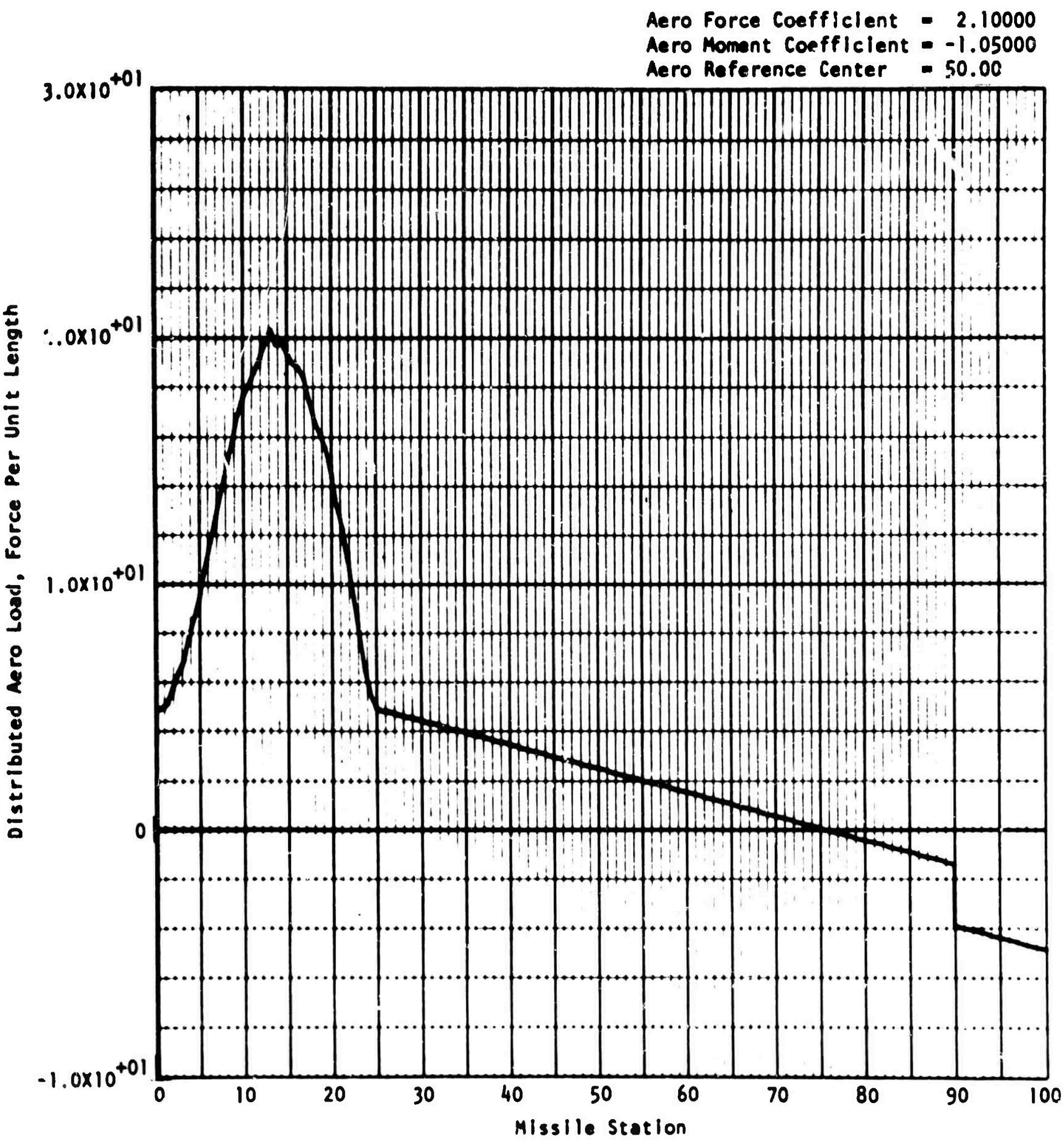
Aero Force Coefficient = 2.10000
Aero Moment Coefficient = -1.05000
Aero Reference Center = 50.00
3.0X10+01
1.0X10+01
0
-1.0X10+01
0
10
20
30
40
50
60
70
80
90
100
Missile Station
Distributed Aero Load, Force Per Unit Length

FIG. B-2(k).

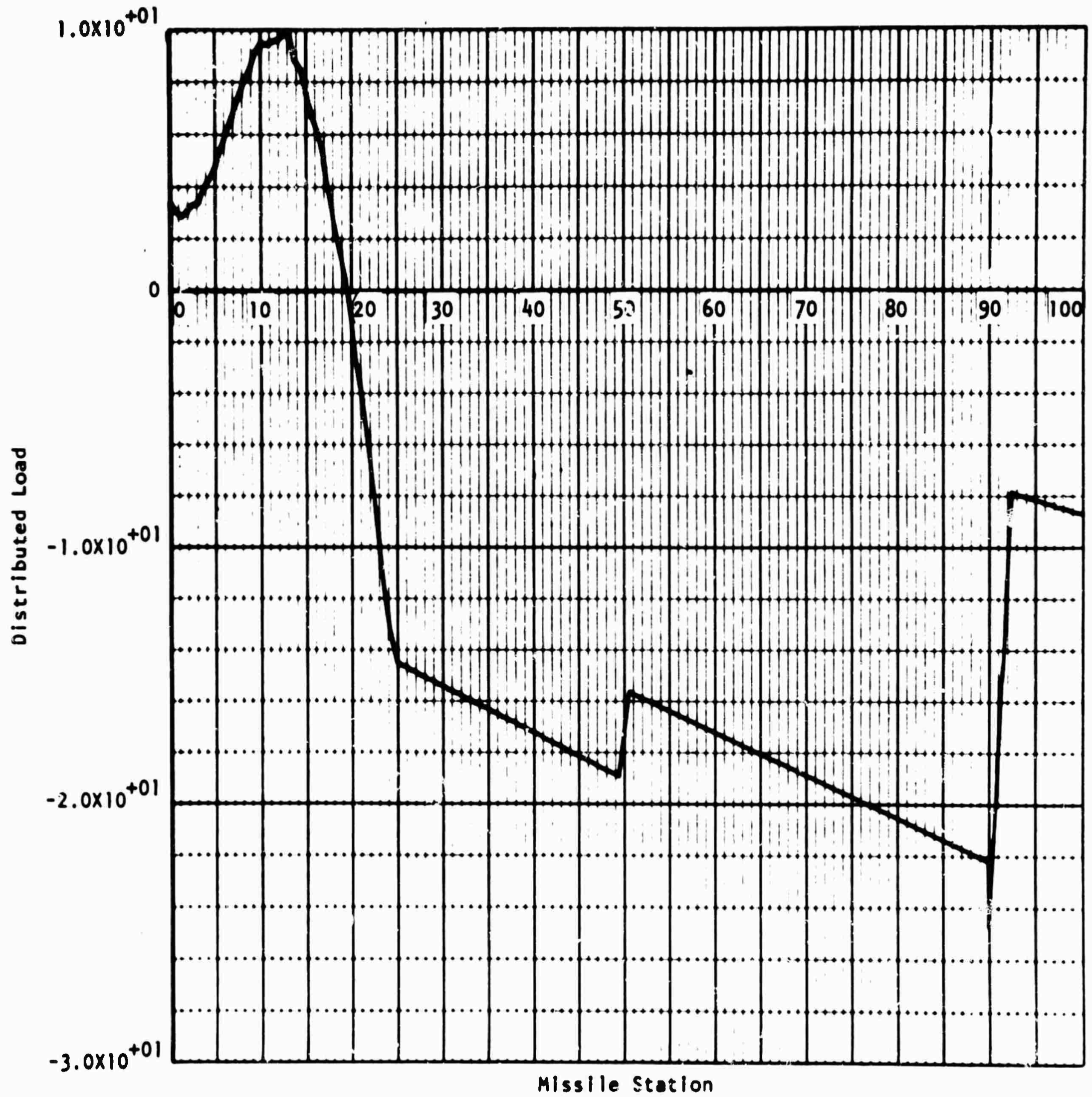
1.0X10+01
0
-1.0X10+01
-2.0X10+01
-3.0X10+01
Distributed Load
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(1).

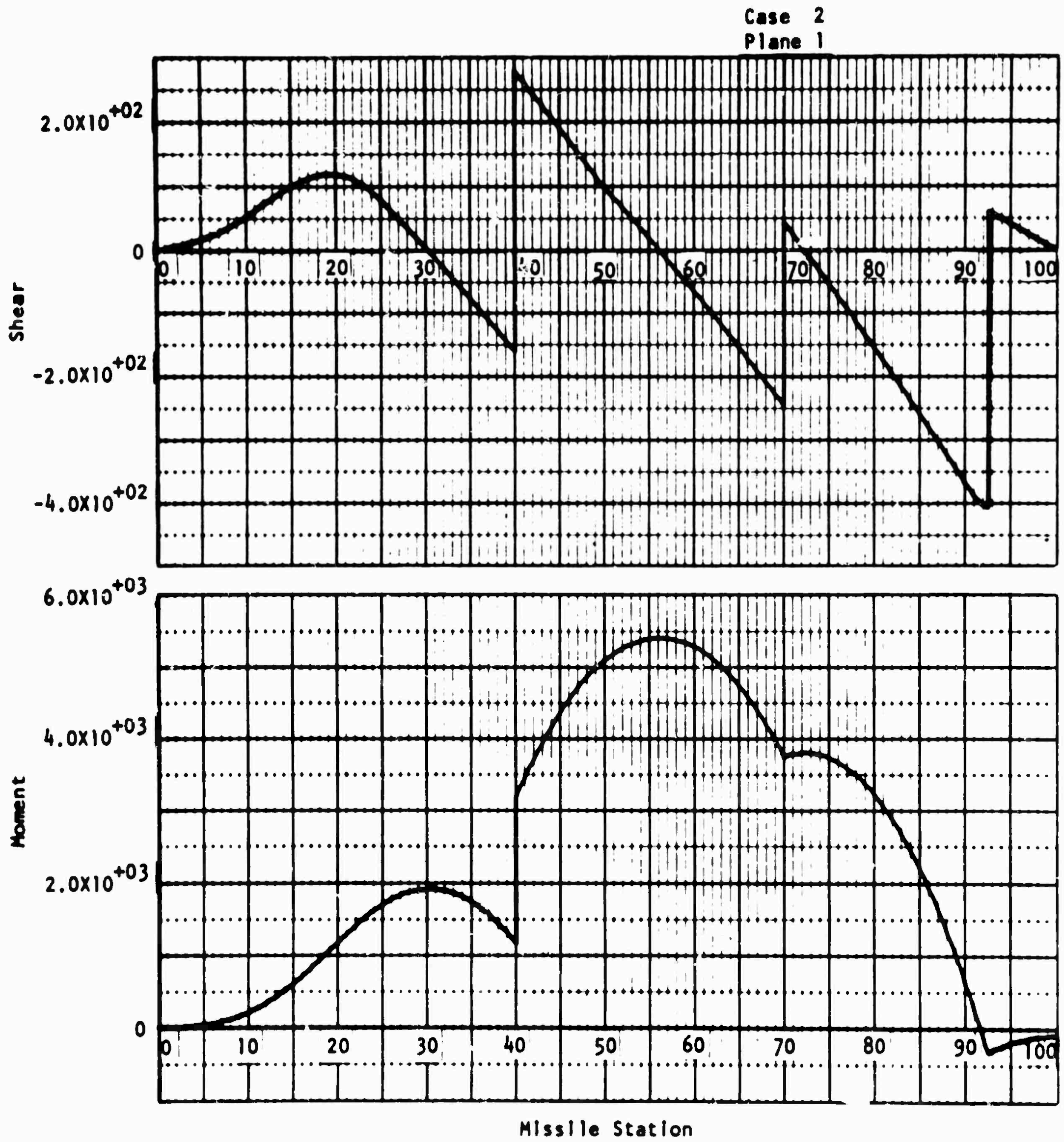
Case 2
Plane 1
2.0X10+02
0
-2.0X10+02
-4.0X10+02
Shear
0
10
20
30
40
50
60
70
80
90
100
6.0X10+03
4.0X10+03
2.0X10+03
0
Moment
Missile Station

FIG. B-2(m).

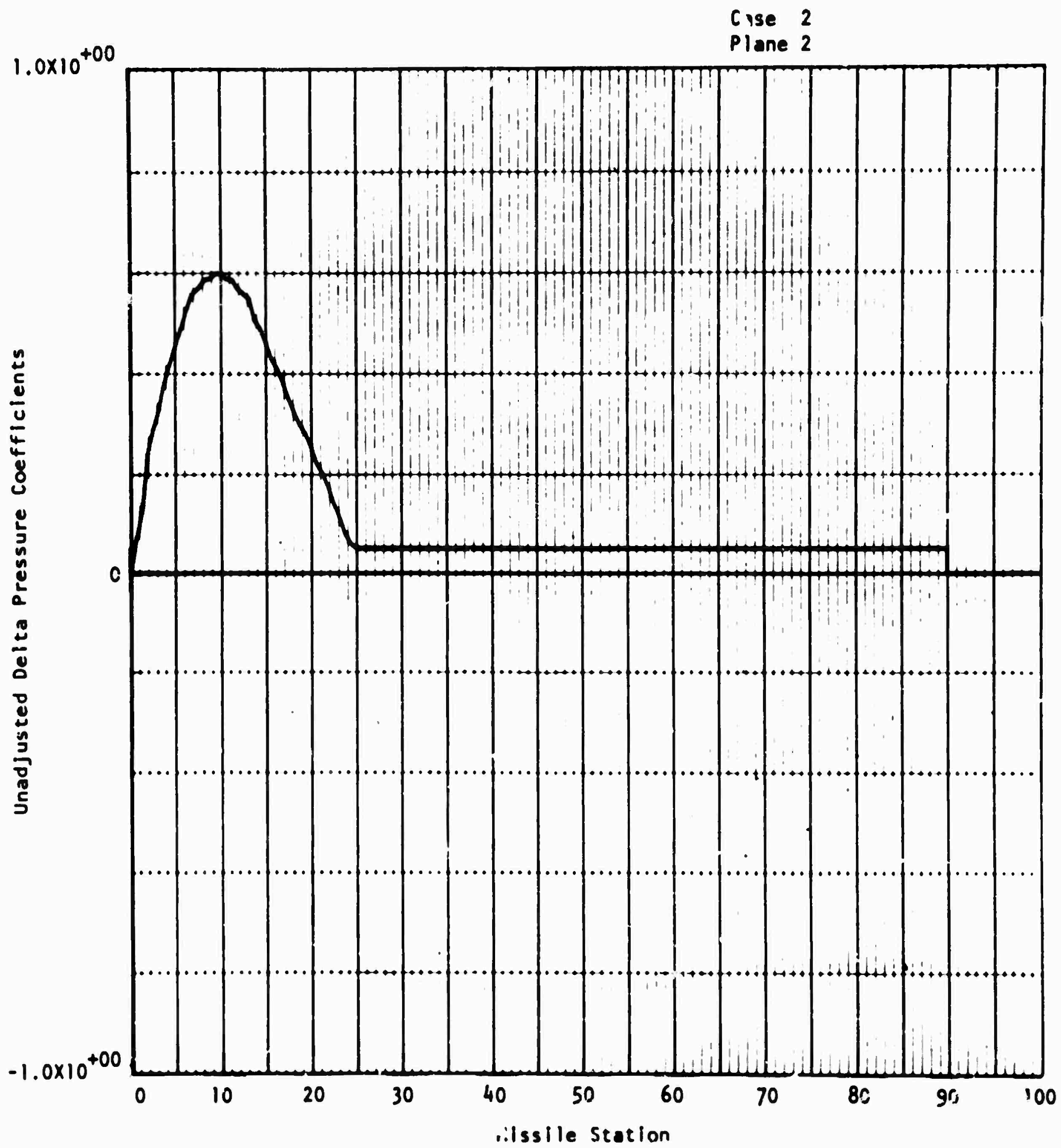
Case 2
Plane 2
1.0X10+00
0
-1.0X10+00
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(n).

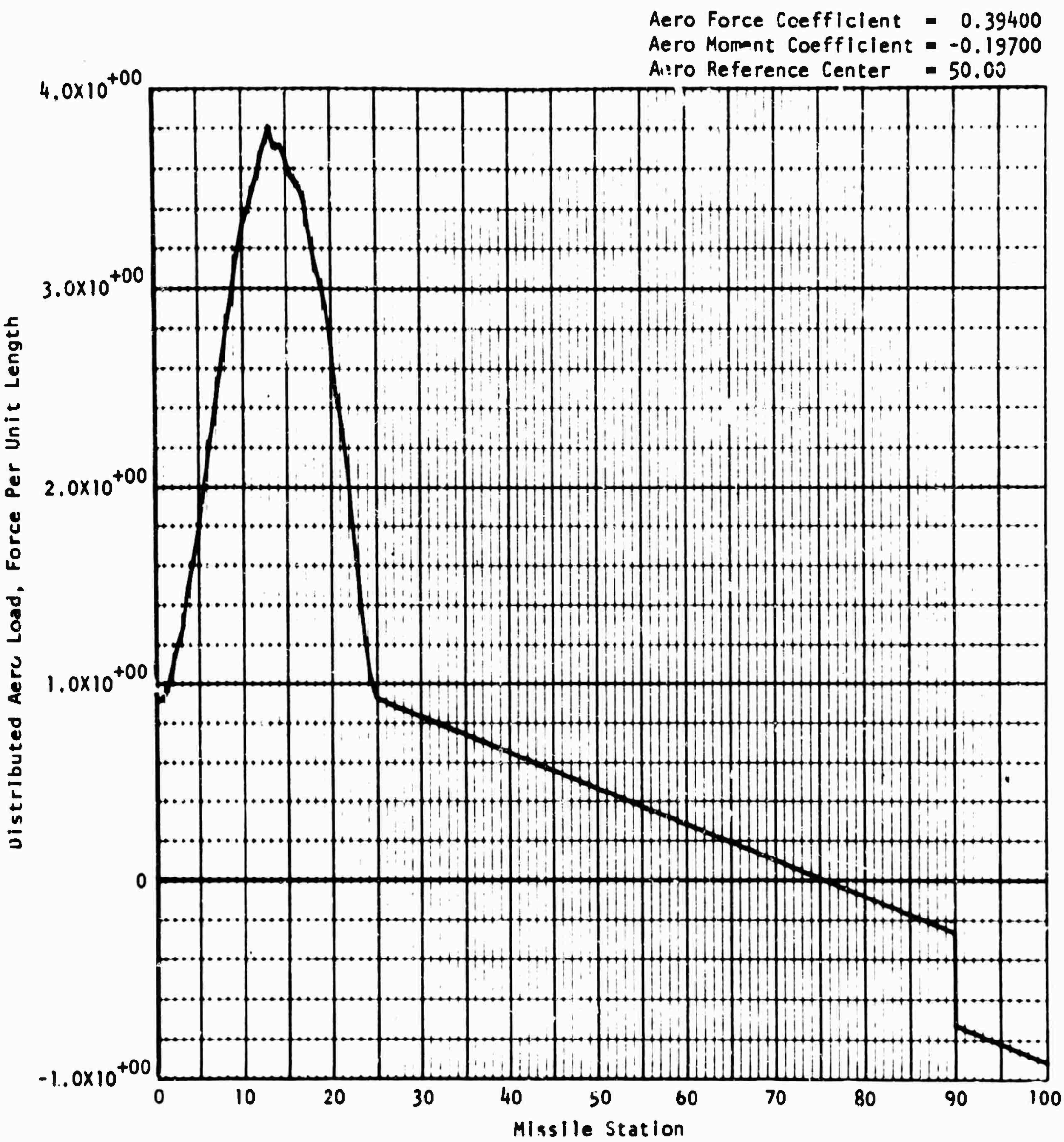
Aero Force Coefficient = 0.39400
Aero Moment Coefficient = -0.19700
Aero Reference Center = 50.00
4.0X10+00
3.0X10+00
2.0X10+00
1.0X10+00
0
-1.0X10+00
Distributed Aero Load, Force Per Unit Length
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(c).

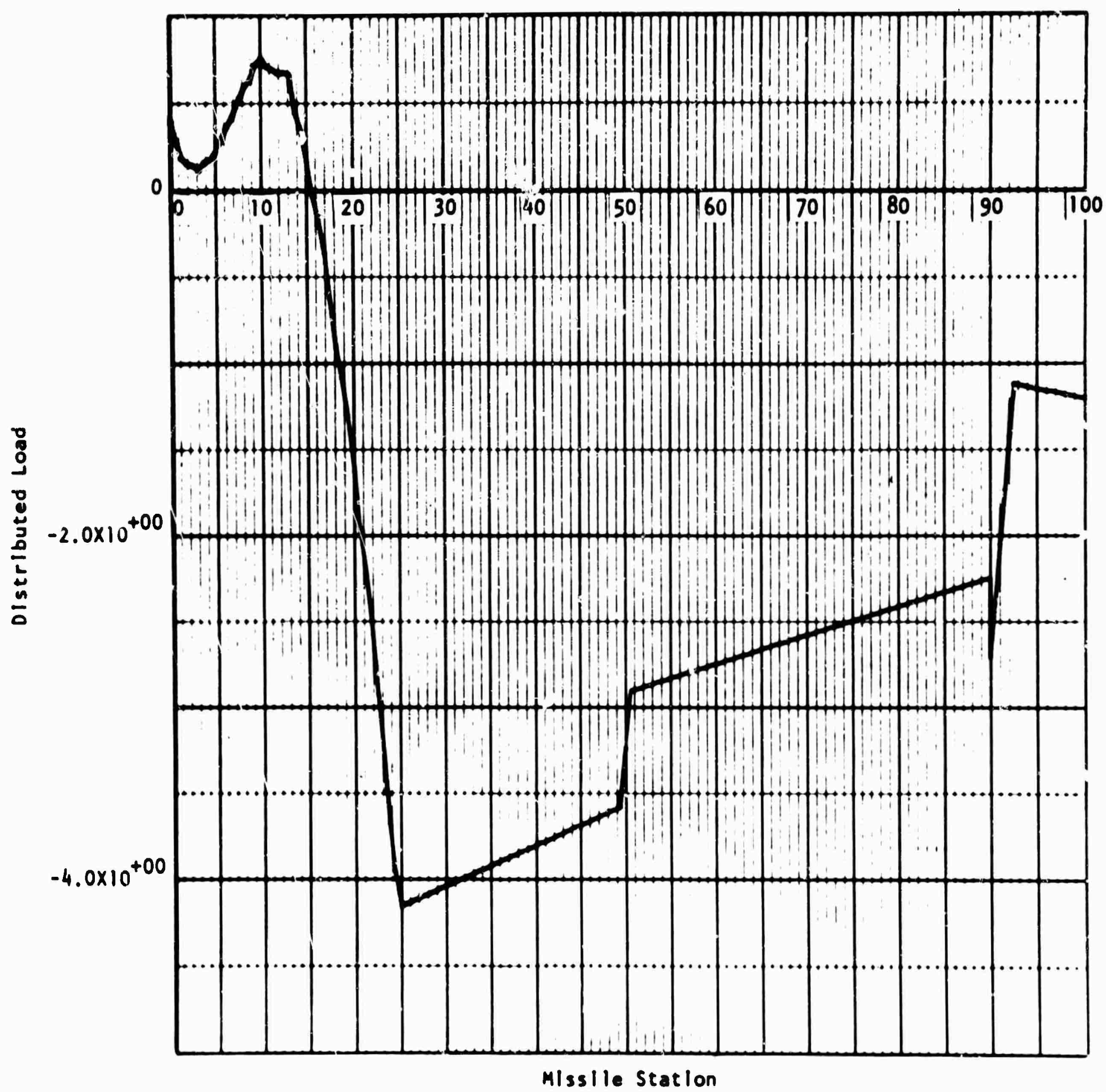
0
0
10
20
30
40
50
60
70
80
90
100
Distributed Load
-2.0X10+00
-4.0X10+00
Missile Station

FIG. B-2(p).

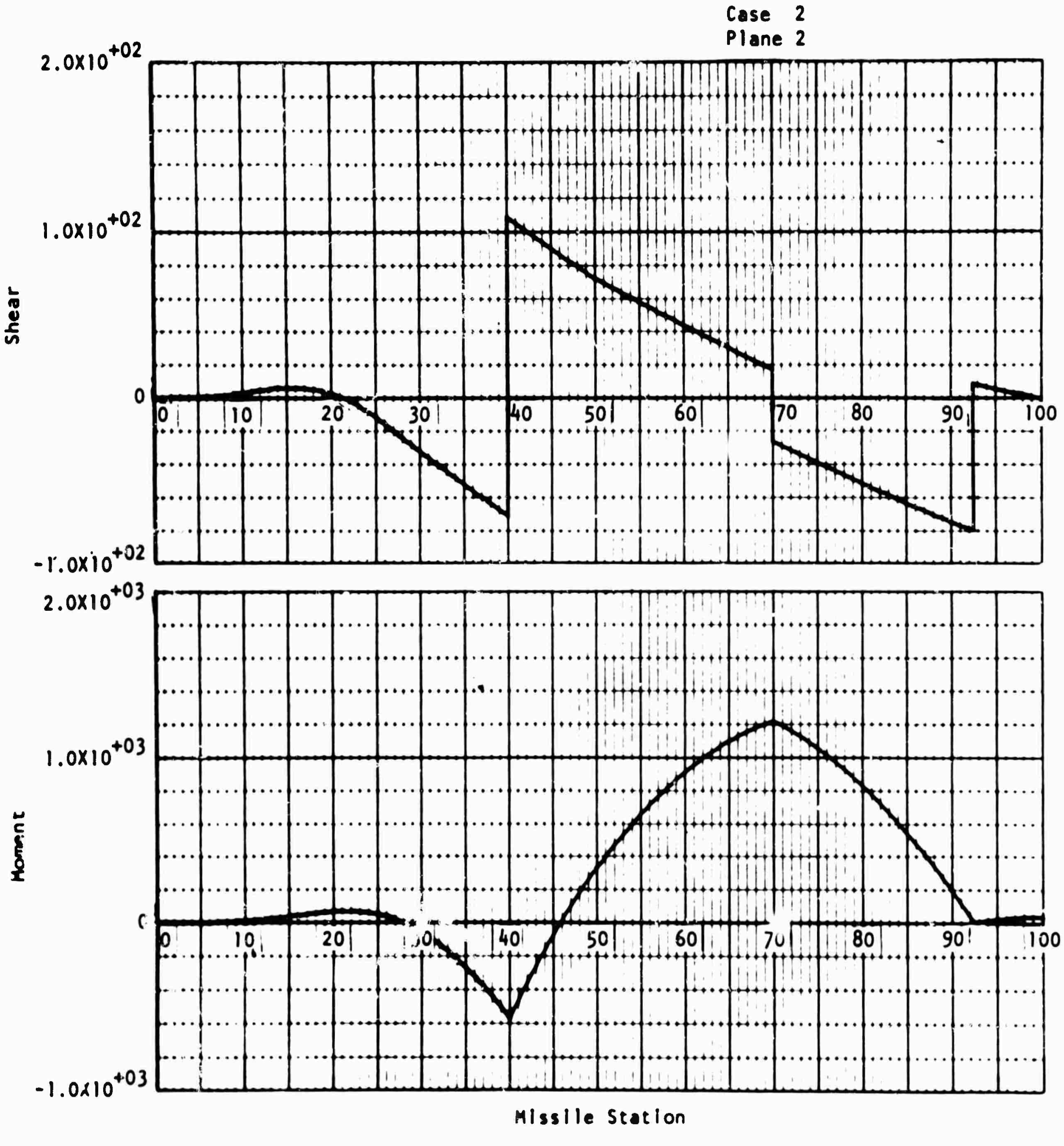
Case 2
Plane 2
2.0X10+02
1.0X10+02
0
-1.0X10+02
Shear
0
10
20
30
40
50
60
70
80
90
100
2.0X10+03
1.0X10+03
0
-1.0X10+03
Moment
Missile Station

FIG. B-2(q).

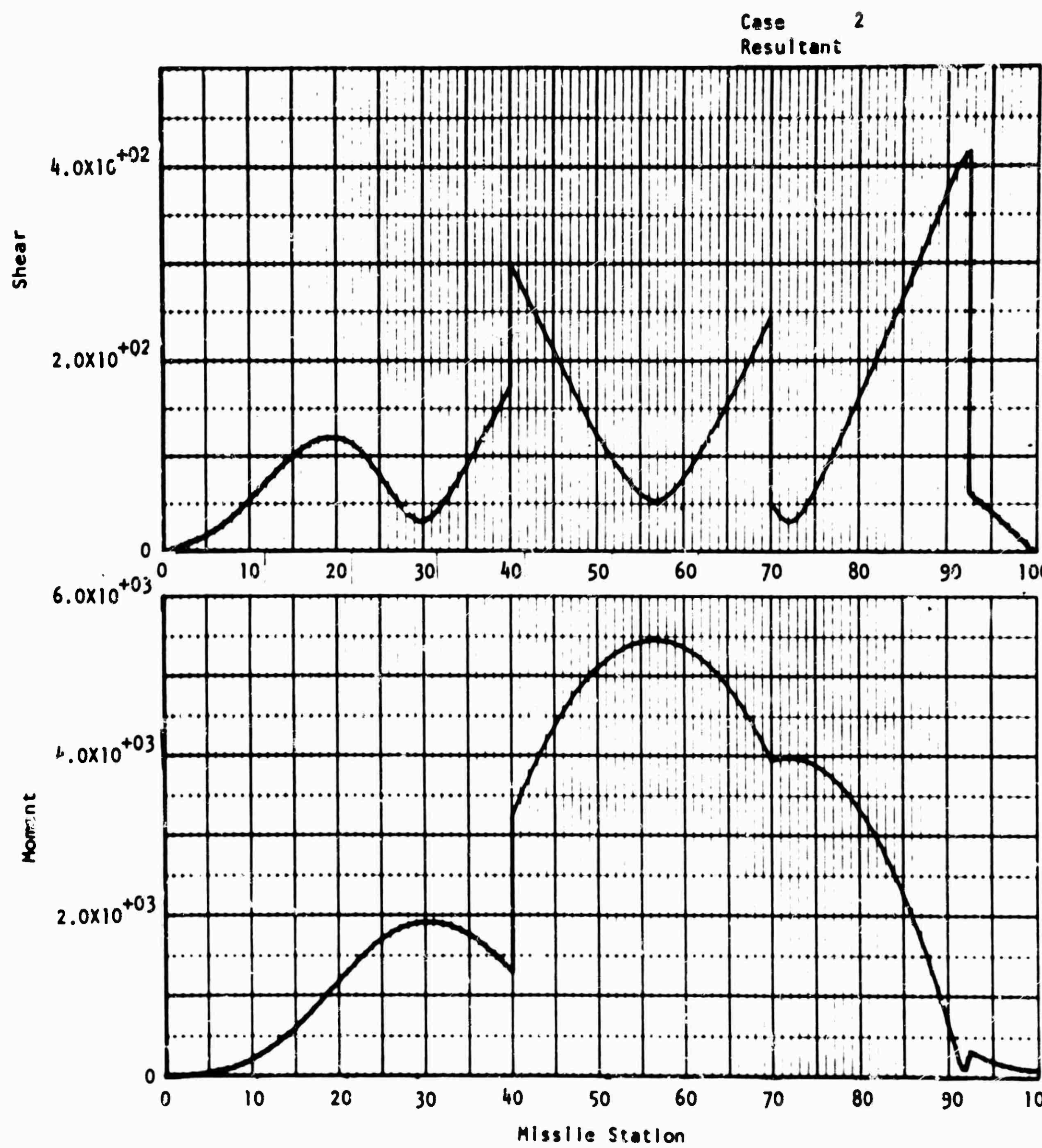
Case 2
Resultant
Shear
4.0X10^{+02}
2.0X10^{+02}
0
0
10
20
30
40
50
60
70
80
90
100
Moment
6.0X10^{+03}
4.0X10^{+03}
2.0X10^{+03}
0
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. B-2(r).

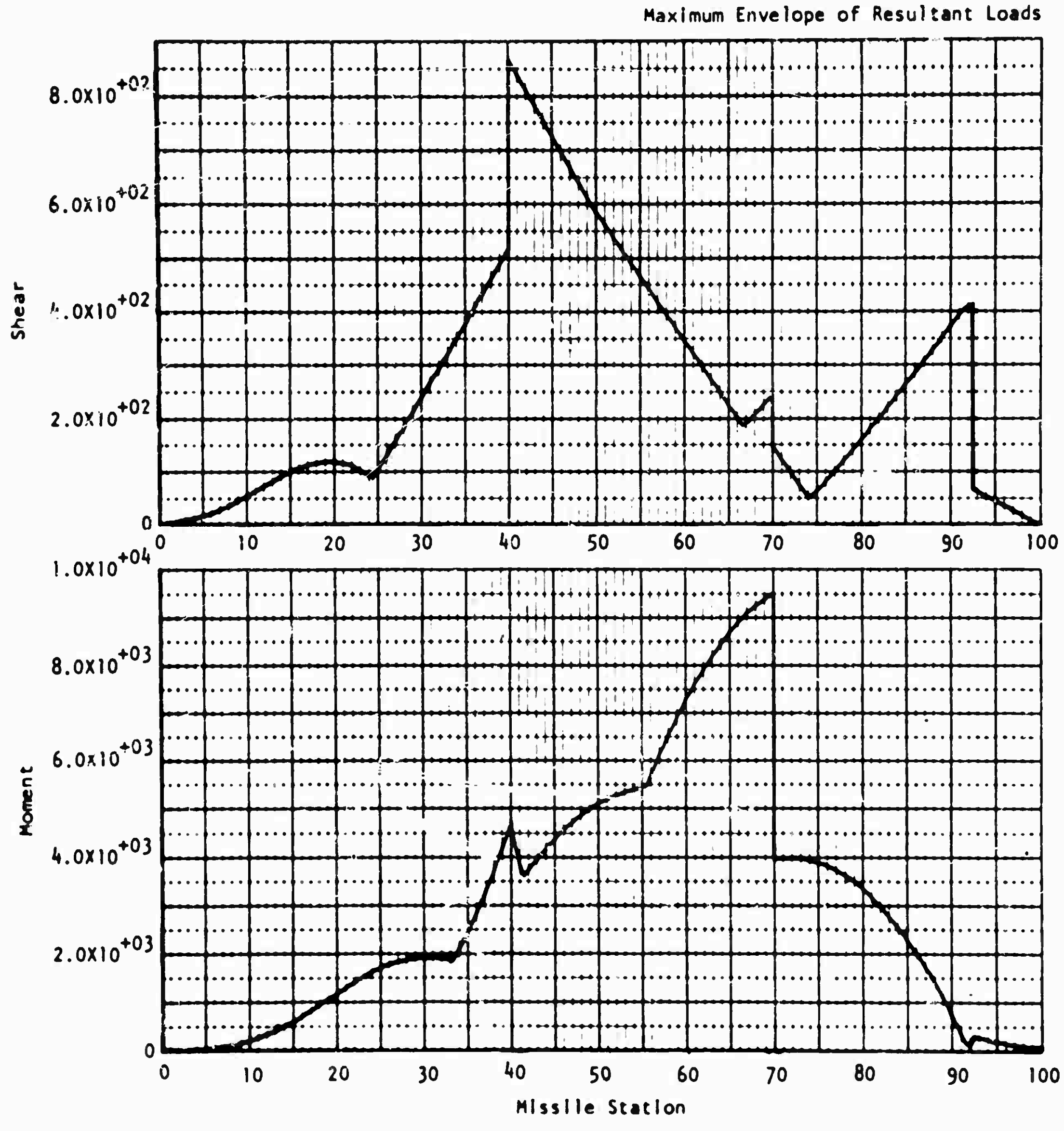
Maximum Envelope of Resultant Loads
Shear
8.0X10+02
6.0X10+02
4.0X10+02
2.0X10+02
0
0 10 20 30 40 50 60 70 80 90 100
Moment
1.0X10+04
8.0X10+03
6.0X10+03
4.0X10+03
2.0X10+03
0
0 10 20 30 40 50 60 70 80 90 100
Missile Station

FIG. B-2(s).

Appendix C

SAMPLE PROBLEM, STORE WITH TWO-LUG, FOUR-SWAY BRACE HANGERS DEMONSTRATING SUBROUTINE HANGER/B

A sample problem using HANGER/B is demonstrated. Basic mass, geometry, and aerodynamic characteristics of the store are described in Appendix A. The hanger configuration is shown in Fig. C-1.

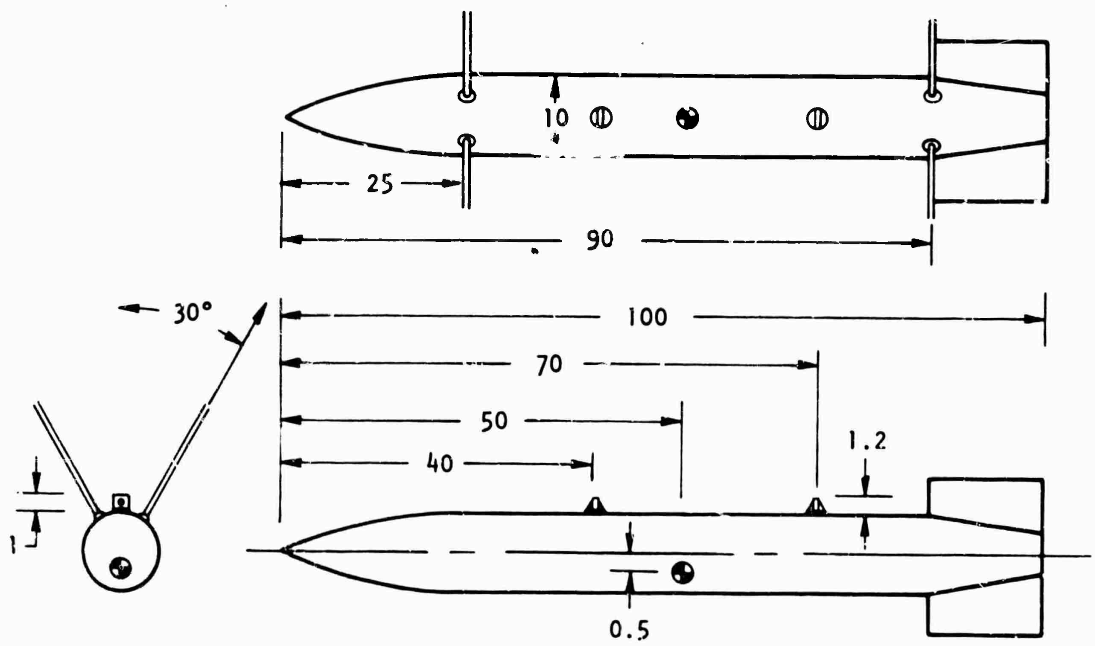

FIG. C-1. Hanger Configuration, Sample Problem.

The forward lug is at station 40 (at the aft end of segment 2) and the aft lug is at station 70 (at the aft end of segment 4). The forward and aft sway braces are located at stations 25 and 90, respectively (at the aft ends of segments 1 and 5). Lugs and sway braces must be located at different stations, as subroutine CONCLD now stands. Lugs take longitudinal loads at a point 1.2 inches above the cylindrical surface of the store, and lateral loads 1 inch above that surface. Sway brace angles are 30 deg. The center of gravity is 1/2 inch below the store's longitudinal axis. A 45-deg cant angle is demonstrated in the following sample, although not shown in Fig. C-1.

A complete sample run using HANGER/B is demonstrated using characteristics described in Appendixes A and C. Listings of input data and resulting output are included. Punched card output of WEIGHT, the adjusted weight and inertia distributions generated in the sample described previously, is used here as input. A Univac 1108 flagged XQT card is exemplified. It is only assumed that all program elements have been loaded into the computer from tape or cards.

TABLE C-1. Input Data for Sample Run Using HANGER/B

```
- RUN 301102,401664,000,005,200                    4062 9 0 L.P.THOMAS  71428
-R  ASG  A=2059
-  XQT  CUR
   IN  A
   TRI  A
   TOC
-  XQT,A  MAIN
 8         -00 100       +03 1        +01      5     10      3     42      1
     7
 0         -00 25        +02    40      0
 25        +02 40        +02    40      1
 40        +02 50        +02    20      1
 50        +02 70        +02    40      1
 70        +02 90        +02    40      1
 90        +02 925       +02     5      1
 925       +02 100       +03    15      1
 200       +03 50        +02 12       +06
 7853975   +02 10        +02 50       +02
   .21908-00    .28086-00    .34263-00    .40441-00    .46618-00    .52796-00
   .58974-00    .65151-00    .71329-00    .77506-00    .83684-00    .89862-00
   .96039-00    .10222+01    .10839+01    .11457+01    .12075+01    .12693+01
   .13310+01    .13928+01    .14546+01    .15164+01    .15782+01    .16399+01
   .17017+01    .17635+01    .18253+01    .18870+01    .19488+01    .20106+01
   .20724+01    .21341+01    .21959+01    .22577+01    .23195+01    .23812+01
   .24430+01    .25048+01    .25666+01    .26283+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .26901+01    .26901+01    .26901+01    .26901+01
   .26901+01    .26901+01    .24710+01
   .24710+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
   .22520+01    .22520+01    .22520+01    .22520+01    .22520+01    .22520+01
```

TABLE C-1. (Continued)

.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	.22520+01
.22520+01	.22520+01	.22520+01	.22520+01	.22520+01	
.22520+01	.18813+01	.15106+01	.11400+01	.76934-00	.39868-00
.39868-00	.39868-00	.39868-00	.39868-00	.39868-00	.39868-00
.39868-00	.39868-00	.39868-00	.39868-00	.39868-00	.39868-00
.39868-00	.39868-00	.39868-00	.39868-00		
.89257-00	.22885+01	.27919+01	.32953+01	.37986+01	.43020+01
.48054+01	.53087+01	.58121+01	.63155+01	.68189+01	.73222+01
.78256+01	.83290+01	.88323+01	.93357+01	.98391+01	.10342+02
.10846+02	.11349+02	.11853+02	.12356+02	.12859+02	.13363+02
.13866+02	.14369+02	.14873+02	.15376+02	.15880+02	.16383+02
.16886+02	.17390+02	.17893+02	.18396+02	.18900+02	.19403+02
.19907+02	.20410+02	.20913+02	.21417+02	.10960+02	
.65760+01	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.13152+02	.13152+02
.13152+02	.13152+02	.13152+02	.13152+02	.65760+01	
.67680+01	.17536+02	.17536+02	.17536+02	.17536+02	.17536+02
.17536+02	.17536+02	.17536+02	.17536+02	.17536+02	.17536+02
.17536+02	.17536+02	.17536+02	.17536+02	.17536+02	.17536+02
.17536+02	.17536+02	.80539+01			
.80539+01	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.73399+01	
.73399+01	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.14680+02	.14680+02
.14680+02	.14680+02	.14680+02	.14680+02	.73399+01	
.73399+01	.12264+02	.98474+01	.74312+01	.50150+01	.12994+01
.12994+01	.25989+01	.25989+01	.25989+01	.25989+01	.25989+01
.25989+01	.25989+01	.25989+01	.25989+01	.25989+01	.25989+01
.25989+01	.25989+01	.25989+01	.12994+01		

0	-00	270	-00	60	-00	86	-00	122	+01	143	+01
18	+01	202	+01	228	+01	26	+01	284	+01	306	+01
342	+01	372	+01	40	+01	434	+01	464	+01	486	+01
51	+01	544	+01	58	+01	612	+01	64	+01	672	+01
698	+01	732	+01	762	+01	8	+01	824	+01	85	+01
88	+01	9	+01	92	+01	94	+01	95	+01	96	+01
978	+01	98	+01	984	+01	996	+01	10	+02		
10	+02	10	+02								
10	+02	10	+02								
10	+02	10	+02								
10	+02	10	+02								
10	+02	9	+01								

TABLE C-1. (Continued)

9	+01 6	+01				
40	+02 70	+02				
105	+02 11	+02 105	+02 5	+01 8	+01	
0	-00 0	-00 0	-00			
2	4	0 0 2				
6	0					
1						
2378	-02 800	+03				
6	+01 0	-00 2	+01 15	+01 115	+02	
5	-00 2	-00-1	-00 2	-00-1	-00	
105	+02 197	+01				
0	-00 0	-00 12	-00 0	-00		
0	-00 0	-00 12	-00 0	-00		
10	+02					
0	-00 7	-01 13	-00 24	-00 29	-00 33	-00
38	-00 42	-00 46	-00 49	-00 53	-00 56	-00
57	-00 587	-00 59	-00 6	-00 6	-00 59	-00
587	-00 57	-00 56	-00 55	-00 51	-00 49	-00
46	-00 43	-00 41	-00 38	-00 35	-00 32	-00
3	-00 28	-00 25	-00 22	-00 2	-00 17	-00
14	-00 11	-00 8	-01 6	-01 5	-01	
5	-01 5	-01				
5	-01 5	-01				
5	-01 5	-01				
5	-01 5	-01				
0	-00 0	-00				
0	-00 0	-00				
1	-02					
1	-02					
2						
2378	-02 800	+03				
-12	+02 6	+01-2	+01 15	+01 8	+01	
5	-00 2	-00-1	-00 2	-00-1	-00	
105	+02 197	+01				
0	-00 0	-00 12	-00 0	-00		
0	-00 0	-00 12	-00 0	-00		
10	+02					
0	-00 7	-01 13	-00 24	-00 29	-00 33	-00
38	-00 42	-00 46	-00 49	-00 53	-00 56	-00
57	-00 587	-00 59	-00 6	-00 6	-00 59	-00
587	-00 57	-00 56	-00 55	-00 51	-00 49	-00
46	-00 43	-00 41	-00 38	-00 35	-00 32	-00
3	-00 28	-00 25	-00 22	-00 2	-00 17	-00
14	-00 11	-00 8	-01 6	-01 5	-01	
5	-01 5	-01				
5	-01 5	-01				
5	-01 5	-01				
5	-01 5	-01				
0	-00 0	-00				
0	-00 0	-00				
1	-02					
1	-02					
-1						
- EOF						
- FIN						

SAMPLE OUTPUT

Following is the printout and SC-4020 plotter output for the sample problem using HANGER/B. First is a sequential listing of x stations, running weight, and section inertias--the weights and inertias are those previously read in from cards Next, store gross weight, inertias, reference dimensions, radius, and hanger dimensions are printed out for the purpose of verifying and identifying input data. Input air density and airspeed are next printed. Gross aerodynamic coefficients computed from input aerodynamic coefficient slopes and flow angles are printed. Linear and angular accelerations imposed upon the store follow next. After dynamic pressure, hanger loads are tabulated (these are part of the sought-after results, often the primary purpose for running the program). Aerodynamics-related data are then printed: data associated with ΔC_p plot status, comments indicating the performance of aerodynamics adjuster routines and the magnitudes of adjustments automatically made, and tabulations of distributed aerodynamic loads including concentrated aerodynamic forces and moments. These aerodynamics-related data are not especially significant other than for debug purposes in showing something of what may be going on within the program, and their output was not cleaned up. They were not deleted either, because it seems inadvisable to let a computer work too long without some kind of output. Next are comments concerning the number of load, shear, and moment points falling off plots--these output comments are actually obsolete, assuming plotter routines work correctly, but were left in as possible debug aids. Following this are significant data--accumulated distributed load, shear, and moments (see discussion of SMDIAG). These important shear and moment data are listed with their stations, and are grouped into segments marked with a CASE number (IBATCH) and a PLANE number. PLANE 1 implies plane of symmetry (vertical plane for zero cant), and PLANE 2 implies a lateral plane perpendicular to this (the horizontal plane for zero cant).

All output from the less significant aerodynamics-related data through printouts of stations, shears, and moments are repeated for the lateral plane. Resultant shears and moments are then tabulated for the case at hand (see description of RSLTNT). These resultants are magnitude resultants of the previous two perpendicular planes' shears and moments at the given station, with no direct indication of direction, unfortunately. One loads case has now been completed, and the output is repeated for another case. After the resultant shears and moments for CASE 2 are listed, the maximum envelope of resultant loads arising from the two cases are tabulated (see description of ENVLOP).

Plotted output for two cases via SC-4020 plotter is shown in Fig. C-2(a) through (s). Figures C-2(a) and C-2(e) are input ΔC_p for the plane of symmetry and the lateral plane. Figures C-2(b) and C-2(f)

are the distributed aerodynamic loads on the missile body in the two perpendicular planes, with adjustments designed to ensure compatibility between gross and distributed aerodynamic forces and moments. Figures C-2(c) and C-2(g) are accumulated distributed loads, aerodynamic and inertial, imposed upon the store. No concentrated loads (such as are expected from hangers or perhaps aerodynamic surfaces) are included in these distributed loads accumulations. All plotter output discussed thus far was intended to serve the user only in depicting loads actually integrated by the computer into shears and moments, or to aid in debugging or critiqueing input data. Little effort was spent in making these plots attractive. Finished plots of shears and moments for two planes are illustrated in Fig. C-2(d) and (h) (see section on SMDIAG). Discontinuities in shears and moments should correspond to hanger loads and concentrated aerodynamic loads previously printed out. Resultant shears and moments for CASE 1 produced by subroutine RSLTNT are illustrated in Fig. C-2(i). Figures C-2(j) through (r) duplicate the previously described sequence for CASE 2. Maximum envelopes of resultant shears and moments arising from the two cases are plotted in Fig. C-2(s).

For the cases run, the output is completed. Note, however, that if more cases had been run, they too would have been output in a continuing sequence, and their resultant shears and moments would have been included in the final maximum envelope plot. If the terminating IBATCH had been other than -1, the maximum envelope plot and printout would not have occurred. If the option to neglect aerodynamics had been exercised (S = 0.0), plots and printouts of ΔC_p and distributed aerodynamic load would not have occurred.

TABLE C-2. Sample Printout

SEG	STATION	WEIGHT	SECTION INERTIA
1	.00000000	.21907999-00	.89257000-00
1	.62500000-00	.28086000-00	.22884999+01
1	.12500000+01	.34263000-00	.27919000+01
1	.18750000+01	.40441000-00	.32952999+01
1	.25000000+01	.46618000-00	.37986000+01
1	.31250000+01	.52795999-00	.43020000+01
1	.37500000+01	.58973999-00	.48053999+01
1	.43750000+01	.65150999-00	.53087000+01
1	.50000000+01	.71329000-00	.58121000+01
1	.56250000+01	.77506000-00	.63155000+01
1	.62500000+01	.83684000-00	.68189000+01
1	.68750000+01	.89861999-00	.73221999+01
1	.75000000+01	.96038999-00	.78256000+01
1	.81250000+01	.10222000+01	.83290000+01
1	.87500000+01	.10839000+01	.88322999+01
1	.93750000+01	.11457000+01	.93356999+01
1	.10000000+02	.12075000+01	.98390999+01
1	.10625000+02	.12693000+01	.10342000+02
1	.11250000+02	.13310000+01	.10846000+02
1	.11875000+02	.13928000+01	.11349000+02
1	.12500000+02	.14546000+01	.11853000+02
1	.13125000+02	.15164000+01	.12356000+02
1	.13750000+02	.15782000+01	.12859000+02
1	.14375000+02	.16399000+01	.13363000+02
1	.15000000+02	.17017000+01	.13866000+02
1	.15625000+02	.17635000+01	.14369000+02
1	.16249999+02	.18253000+01	.14873000+02
1	.16875000+02	.18870000+01	.15376000+02
1	.17500000+02	.19488000+01	.15880000+02
1	.18125000+02	.20106000+01	.16383000+02
1	.18750000+02	.20723999+01	.16886000+02
1	.19374999+02	.21341000+01	.17389999+02
1	.20000000+02	.21958999+01	.17892999+02
1	.20625000+02	.22577000+01	.18396000+02
1	.21250000+02	.23195000+01	.18900000+02
1	.21875000+02	.23812000+01	.19402999+02
1	.22499999+02	.24429999+01	.19906999+02
1	.23125000+02	.25048000+01	.20410000+02
1	.23750000+02	.25666000+01	.20913000+02
1	.24375000+02	.26283000+01	.21416999+02
1	.25000000+02	.26901000+01	.10960000+02
2	.25000000+02	.26901000+01	.65760000+01
2	.25375000+02	.26901000+01	.13152000+02
2	.25749999+02	.26901000+01	.13152000+02
2	.26125000+02	.26901000+01	.13152000+02
2	.26499999+02	.26901000+01	.13152000+02
2	.26875000+02	.26901000+01	.13152000+02
2	.27249999+02	.26901000+01	.13152000+02
2	.27625000+02	.26901000+01	.13152000+02
2	.27999999+02	.26901000+01	.13152000+02
2	.28375000+02	.26901000+01	.13152000+02
2	.28749999+02	.26901000+01	.13152000+02
2	.29125000+02	.26901000+01	.13152000+02
2	.29499999+02	.26901000+01	.13152000+02
2	.29875000+02	.26901000+01	.13152000+02
2	.30249999+02	.26901000+01	.13152000+02
2	.30625000+02	.26901000+01	.13152000+02

TABLE C-2. (Continued)

2	.30999999+02	.26901000+01	.13152000+02
2	.31375000+02	.26901000+01	.13152000+02
2	.31750000+02	.26901000+01	.13152000+02
2	.32125000+02	.26901000+01	.13152000+02
2	.32500000+02	.26901000+01	.13152000+02
2	.32875000+02	.26901000+01	.13152000+02
2	.33250000+02	.26901000+01	.13152000+02
2	.33625000+02	.26901000+01	.13152000+02
2	.34000000+02	.26901000+01	.13152000+02
2	.34375000+02	.26901000+01	.13152000+02
2	.34750000+02	.26901000+01	.13152000+02
2	.35125000+02	.26901000+01	.13152000+02
2	.35500000+02	.26901000+01	.13152000+02
2	.35874999+02	.26901000+01	.13152000+02
2	.36250000+02	.26901000+01	.13152000+02
2	.36624999+02	.26901000+01	.13152000+02
2	.37000000+02	.26901000+01	.13152000+02
2	.37374999+02	.26901000+01	.13152000+02
2	.37750000+02	.26901000+01	.13152000+02
2	.38124999+02	.26901000+01	.13152000+02
2	.38500000+02	.26901000+01	.13152000+02
2	.38874999+02	.26901000+01	.13152000+02
2	.39250000+02	.26901000+01	.13152000+02
2	.39624999+02	.26901000+01	.13152000+02
2	.40000000+02	.26901000+01	.6576[illegible]+01
3	.40000000+02	.26901000+01	.87679999+01
3	.40499999+02	.26901000+01	.17535999+02
3	.41000000+02	.26901000+01	.17535999+02
3	.41500000+02	.26901000+01	.17535999+02
3	.41999999+02	.26901000+01	.17535999+02
3	.42500000+02	.26901000+01	.17535999+02
3	.43000000+02	.26901000+01	.17535999+02
3	.43499999+02	.26901000+01	.17535999+02
3	.44000000+02	.26901000+01	.17535999+02
3	.44500000+02	.26901000+01	.17535999+02
3	.45000000+02	.26901000+01	.17535999+02
3	.45500000+02	.26901000+01	.17535999+02
3	.45999999+02	.26901000+01	.17535999+02
3	.46500000+02	.26901000+01	.17535999+02
3	.47000000+02	.26901000+01	.17535999+02
3	.47499999+02	.26901000+01	.17535999+02
3	.48000000+02	.26901000+01	.17535999+02
3	.48500000+02	.26901000+01	.17535999+02
3	.48999999+02	.26901000+01	.17535999+02
3	.49500000+02	.26901000+01	.17535999+02
3	.50000000+02	.24710000+01	.80538999+01
4	.50000000+02	.24710000+01	.80538999+01
4	.50500000+02	.22520000+01	.14680000+02
4	.51000000+02	.22520000+01	.14680000+02
4	.51499999+02	.22520000+01	.14680000+02
4	.52000000+02	.22520000+01	.14680000+02
4	.52500000+02	.22520000+01	.14680000+02
4	.52999999+02	.22520000+01	.14680000+02
4	.53500000+02	.22520000+01	.14680000+02
4	.54000000+02	.22520000+01	.14680000+02
4	.54499999+02	.22520000+01	.14680000+02
4	.55000000+02	.22520000+01	.14680000+02
4	.55500000+02	.22520000+01	.14680000+02

TABLE C-2. (Continued)

4	.55999999+02	.22520000+01	.14680000+02
4	.56500000+02	.22520000+01	.14680000+02
4	.57000000+02	.22520000+01	.14680000+02
4	.57500000+02	.22520000+01	.14680000+02
4	.58000000+02	.22520000+01	.14680000+02
4	.58499999+02	.22520000+01	.14680000+02
4	.59000000+02	.22520000+01	.14680000+02
4	.59500000+02	.22520000+01	.14680000+02
4	.59999999+02	.22520000+01	.14680000+02
4	.60500000+02	.22520000+01	.14680000+02
4	.61000000+02	.22520000+01	.14680000+02
4	.61499999+02	.22520000+01	.14680000+02
4	.62000000+02	.22520000+01	.14680000+02
4	.62500000+02	.22520000+01	.14680000+02
4	.63000000+02	.22520000+01	.14680000+02
4	.63500000+02	.22520000+01	.14680000+02
4	.64000000+02	.22520000+01	.14680000+02
4	.64500000+02	.22520000+01	.14680000+02
4	.65000000+02	.22520000+01	.14680000+02
4	.65499999+02	.22520000+01	.14680000+02
4	.66000000+02	.22520000+01	.14680000+02
4	.66500000+02	.22520000+01	.14680000+02
4	.66999999+02	.22520000+01	.14680000+02
4	.67500000+02	.22520000+01	.14680000+02
4	.68000000+02	.22520000+01	.14680000+02
4	.68499999+02	.22520000+01	.14680000+02
4	.69000000+02	.22520000+01	.14680000+02
4	.69500000+02	.22520000+01	.14680000+02
4	.70000000+02	.22520000+01	.73399000+01
5	.70000000+02	.22520000+01	.73399000+01
5	.70500000+02	.22520000+01	.14680000+02
5	.70999999+02	.22520000+01	.14680000+02
5	.71500000+02	.22520000+01	.14680000+02
5	.72000000+02	.22520000+01	.14680000+02
5	.72499999+02	.22520000+01	.14680000+02
5	.73000000+02	.22520000+01	.14680000+02
5	.73500000+02	.22520000+01	.14680000+02
5	.73999999+02	.22520000+01	.14680000+02
5	.74500000+02	.22520000+01	.14680000+02
5	.75000000+02	.22520000+01	.14680000+02
5	.75500000+02	.22520000+01	.14680000+02
5	.76000000+02	.22520000+01	.14680000+02
5	.76500000+02	.22520000+01	.14680000+02
5	.77000000+02	.22520000+01	.14680000+02
5	.77500000+02	.22520000+01	.14680000+02
5	.77999999+02	.22520000+01	.14680000+02
5	.78500000+02	.22520000+01	.14680000+02
5	.79000000+02	.22520000+01	.14680000+02
5	.79499999+02	.22520000+01	.14680000+02
5	.80000000+02	.22520000+01	.14680000+02
5	.80500000+02	.22520000+01	.14680000+02
5	.80999999+02	.22520000+01	.14680000+02
5	.81500000+02	.22520000+01	.14680000+02
5	.82000000+02	.22520000+01	.14680000+02
5	.82500000+02	.22520000+01	.14680000+02
5	.83000000+02	.22520000+01	.14680000+02
5	.83499999+02	.22520000+01	.14680000+02
5	.84000000+02	.22520000+01	.14680000+02

TABLE C-2. (Continued)

5	.84500000+02	.22520000+01	.14680000+02
5	.84999999+02	.22520000+01	.14680000+02
5	.85500000+02	.22520000+01	.14680000+02
5	.86000000+02	.22520000+01	.14680000+02
5	.86499999+02	.22520000+01	.14680000+02
5	.87000000+02	.22520000+01	.14680000+02
5	.87500000+02	.22520000+01	.14680000+02
5	.88000000+02	.22520000+01	.14680000+02
5	.88500000+02	.22520000+01	.14680000+02
5	.89000000+02	.22520000+01	.14680000+02
5	.89500000+02	.22520000+01	.14680000+02
5	.90000000+02	.22520000+01	.73399000+01
6	.90000000+02	.22520000+01	.73399000+01
6	.90499999+02	.18813000+01	.12264000+02
6	.91000000+02	.15106000+01	.98474000+01
6	.91500000+02	.11400000+01	.74312000+01
6	.91999999+02	.76933999-00	.50150000+01
6	.92500000+02	.39867999-00	.12994000+01
7	.92500000+02	.39867999-00	.12994000+01
7	.93000000+02	.39867999-00	.25989000+01
7	.93499999+02	.39867999-00	.25989000+01
7	.94000000+02	.39867999-00	.25989000+01
7	.94500000+02	.39867999-00	.25989000+01
7	.95000000+02	.39867999-00	.25989000+01
7	.95500000+02	.39867999-00	.25989000+01
7	.96000000+02	.39867999-00	.25989000+01
7	.96500000+02	.39867999-00	.25989000+01
7	.97000000+02	.39867999-00	.25989000+01
7	.97499999+02	.39867999-00	.25989000+01
7	.98000000+02	.39867999-00	.25989000+01
7	.98500000+02	.39867999-00	.25989000+01
7	.98999999+02	.39867999-00	.25989000+01
7	.99500000+02	.39867999-00	.25989000+01
7	.10000000+03	.39867999-00	.12994000+01

HANGER LOADS ON MISSILE, UP AND STARB,D ARE POSITIVE
CASE 1

MISSILE CHARACTERISTICS

WEIGHT = .20000+03 LBS
PITCH INERTIA = .12000+06 LB*IN**2
YAW INERTIA = .12000+06 LB*IN**2
REFERENCE AREA = .78540+02 SQ.IN

HANGER DIMENSIONS, INCHES AND DEGREES

RADIUS	H	C	E
.5000+01	.1000+01	.1200+01	.5000-00

CANT ANGLE = .45000+02 DEGREES
SWAY BRACE ANGLES, DEGREES

FOWD BETA	AFT BETA
.3000+02	.3000+02

TABLE C-2. (Continued)

```
CG STA.       FSBSTA       RSBSTA       F HGR STA   R HGR STA
    .5000+02     .2500+02     .9000+02     .4000+02     .7000+02

MOMENT ARMS, INCHES
XF            XA            XBF           XBA
    .1000+02     .2000+02     .2500+02     .4000+02

REFERENCE LENGTH , INCHES
CBAR =      .1000+02


AERODYNAMIC DATA

RHO =     .23780-02 SLUGS/CU FT
V =     .80000+03 FT/SEC TAS
NORMAL FORCE COEF =     .17635+01
DRAG COEF =     .50000-00
LATERAL FORCE COEF    -.12063+01
PITCH MOMENT COEF =    -.88176-00
YAW MOMENT COEF =     .60316-00

LOAD FACTORS
GX =     .20000+01
GY =     .15000+01
GZ =     .11500+02

ANGULAR ACCELERATIONS, RADIANS PER SQUARE SECOND
THETA DOUBLE DOT =     .60000+01
PSI DOUBLE DOT =     .00000


DYNAMIC PRESSURE =     .52844+01 LBS/SQ.IN.
HANGER LOADS

RZF    =     .24028+04 LBS
RZA    =     .41795+03 LBS
RYF    =     .50752+02 LBS
RYA    =     .25376+02 LBS
RXA    =     .00000    LBS
RXF    =     .60752+03 LBS
RFSBZ =    -.11567+04 LBS
RRSBZ =    -.55745+03 LBS
RFSBY =    -.66783+03 LBS
RRSBY =    -.32184+03 LBS
HM =    -.40704+04 LB'IN AT NO.    2 SEGMENT

SWAY BRACE LOADS
RBFMX =     .13357+04 LBS
RBFMN =     .00000    LBS
RBAMX =     .64368+03 LBS
RBAMN =     .00000    LBS
RBFMX IS AT RIGHT FRONT BRACE
RBAMX IS AT RIGHT REAR BRACE
```

TABLE C-2. (Continued)

```
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL =    -.40830500+01
DELARL =    -.40830500+01
ADJUSTED SUMMED AERO FORCE COEFF =      .17632132+01
ADJUSTED SUMMED AERO MOMENT COEFF =    -.88167507-00
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  1
    .40831+01   .41110+01   .43068+01   .47922+01   .53569+01   .57992+01
    .66342+01   .72700+01   .80561+01   .89459+01   .98607+01   .10680+02
    .11614+02   .12542+02   .13227+02   .14196+02   .14897+02   .15194+02
    .15671+02   .16067+02   .16631+02   .17073+02   .16596+02   .16665+02
    .16271+02   .15956+02   .15807+02   .15405+02   .14702+02   .13966+02
    .13581+02   .13028+02   .12058+02   .11038+02   .10285+02   .91144+01
    .79655+01   .66980+01   .54321+01   .45891+01   .41303+01
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  2
    .41303+01   .40997+01   .40690+01   .40384+01   .40078+01   .39772+01
    .39466+01   .39159+01   .38853+01   .38547+01   .38241+01   .37934+01
    .37628+01   .37322+01   .37016+01   .36709+01   .36403+01   .36097+01
    .35791+01   .35485+01   .35178+01   .34872+01   .34566+01   .34260+01
    .33953+01   .33647+01   .33341+01   .33035+01   .32728+01   .32422+01
    .32116+01   .31810+01   .31504+01   .31197+01   .30891+01   .30585+01
    .30279+01   .29972+01   .29666+01   .29360+01   .29054+01
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  3
    .29054+01   .28645+01   .28237+01   .27829+01   .27421+01   .27012+01
    .26604+01   .26196+01   .25787+01   .25379+01   .24971+01   .24562+01
    .24154+01   .23746+01   .23337+01   .22929+01   .22521+01   .22113+01
    .21704+01   .21296+01   .20888+01
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  4
    .20888+01   .20479+01   .20071+01   .19663+01   .19254+01   .18846+01
    .18438+01   .18029+01   .17621+01   .17213+01   .16805+01   .16396+01
    .15988+01   .15580+01   .15171+01   .14763+01   .14355+01   .13946+01
    .13538+01   .13130+01   .12722+01   .12313+01   .11905+01   .11497+01
    .11088+01   .10680+01   .10272+01   .98634-00   .94551-00   .90468-00
    .86385-00   .82302-00   .78219-00   .74136-00   .70053-00   .65970-00
    .61886-00   .57803-00   .53720-00   .49637-00   .45554-00
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  5
    .45554-00   .41471-00   .37388-00   .33305-00   .29222-00   .25139-00
    .21056-00   .16973-00   .12890-00   .88068-01   .47238-01   .64071-02
   -.34423-01  -.75254-01  -.11608+00  -.15691-00  -.19775-00  -.23858-00
   -.27941-00  -.32024-00  -.36107-00  -.40190-00  -.44273-00  -.48356-00
   -.52439-00  -.56522-00  -.60605-00  -.64688-00  -.68771-00  -.72854-00
   -.76937-00  -.81020-00  -.85103-00  -.89186-00  -.93269-00  -.97352-00
   -.10144+01  -.10552+01  -.10960+01  -.11368+01  -.11777+01
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TABLE C-2. (Continued)

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    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
  -.32664+01  -.33073+01  -.33481+01  -.33889+01  -.34298+01  -.34706+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
  -.34706+01  -.35114+01  -.35523+01  -.35931+01  -.36339+01  -.36747+01
  -.37156+01  -.37564+01  -.37972+01  -.38381+01  -.38789+01  -.39197+01
  -.39606+01  -.40014+01  -.40422+01  -.40831+01
CONCENTRATED AERO FORCES AND MOMENTS
   .00000       .00000
   .00000       .00000
   .00000       .00000
   .00000       .00000
   .00000       .00000
   .39372+03    .00000
   .00000       .00000
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 MOMENT POINTS FELL OFF YOUR PLOT


CASE      1
PLANE      1
SEGMENT     1
```

STATION	LOAD	SHEAR	MOMENT
0.00000000	1.94881111+00	0.00000000	-9.80826250-03
6.25000000-01	1.37680709+00	1.03925567+00	2.99619560-01
1.25000000+00	9.73685620-01	1.77378465+00	1.17316290+00
1.87500000+00	8.60817910-01	2.34706700+00	2.45539720+00
2.50000000+00	8.28268950-01	2.87490660+00	4.08173330+00
3.12500000+00	6.74069820-01	3.34438750+00	6.01973090+00
3.75000000+00	9.13406670-01	3.84047380+00	8.25946830+00
4.37500000+00	9.54421040-01	4.42417000+00	1.08366386+01
5.00000000+00	1.14657807+00	5.08073220+00	1.38013887+01
5.62500000+00	1.44328308+00	5.89006380+00	1.72242310+01
6.25000000+00	1.76580488+00	6.89290380+00	2.12133760+01
6.87500000+00	1.99392795+00	8.06782030+00	2.58830720+01
7.50000000+00	2.33746010+00	9.42137910+00	3.13429150+01
8.12500000+00	2.67493810+00	1.09877535+01	3.77152360+01
8.75000000+00	2.77253080+00	1.26900874+01	4.51090310+01
9.37500000+00	3.15257470+00	1.45416828+01	5.36134270+01
1.00000000+01	3.26610610+00	1.65475200+01	6.33232710+01
1.06250000+01	2.97693730+00	1.84984710+01	7.42696170+01
1.12500000+01	2.86879520+00	2.03252620+01	8.63964950+01
1.18750000+01	2.68033070+00	2.20593640+01	9.96361640+01
1.25000000+01	2.66023400+00	2.37282900+01	1.13939265+02

TABLE C-2. (Continued)

1.31250000+01	2.51900260+00	2.53468020+01	1.29269700+02
1.37500000+01	1.45956444+00	2.65901040+01	1.45494450+02
1.43750000+01	9.48354010-01	2.73425780+01	1.62342880+02
1.50000000+01	-2.58364680-02	2.76308650+01	1.79516550+02
1.56250000+01	-9.20640710-01	2.73350910+01	1.96687880+02
1.62499990+01	-1.64833045+00	2.65322880+01	2.13515910+02
1.68750000+01	-2.62820910+00	2.51958690+01	2.29675430+02
1.75000000+01	-3.90814190+00	2.31532600+01	2.44778990+02
1.81250000+01	-5.22064510+00	2.03005140+01	2.58352760+02
1.87500000+01	-6.18138830+00	1.67373780+01	2.69921580+02
1.93749990+01	-7.30743070+00	1.25221231+01	2.79059630+02
2.00000000+01	-8.85132980+00	7.47251050+00	2.85302420+02
2.06250000+01	-1.04445107+01	1.44256031+00	2.88082850+02
2.12500000+01	-1.17694810+01	-5.49931210+00	2.86809590+02
2.18750000+01	-1.35104048+01	-1.33992762+01	2.80898250+02
2.24999990+01	-1.52297070+01	-2.23805610+01	2.69711520+02
2.31250000+01	-1.70668020+01	-3.24732190+01	2.52564180+02
2.37500000+01	-1.89013780+01	-4.37132750+01	2.28750380+02
2.43750000+01	-2.03113910+01	-5.59672660+01	1.97594660+02
2.50000000+01	-2.13371720+01	-6.89824420+01	1.58662800+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	-2.13371720+01	-1.22569470+03	1.58590530+02
2.53750000+01	-2.13567090+01	-1.23369980+03	-3.02618210+02
2.57499990+01	-2.13762470+01	-1.24171220+03	-7.66757980+02
2.61250000+01	-2.13957850+01	-1.24973200+03	-1.23390370+03
2.64999990+01	-2.14153220+01	-1.25775900+03	-1.70405830+03
2.68750000+01	-2.14348600+01	-1.26579340+03	-2.17722440+03
2.72499990+01	-2.14543980+01	-1.27383520+03	-2.65340470+03
2.76250000+01	-2.14739350+01	-1.28188420+03	-3.13260210+03
2.79999990+01	-2.14934720+01	-1.28994060+03	-3.61481930+03
2.83750000+01	-2.15130100+01	-1.29800430+03	-4.10005890+03
2.87499990+01	-2.15325470+01	-1.30607540+03	-4.58832380+03
2.91250000+01	-2.15520850+01	-1.31415370+03	-5.07961680+03
2.94999990+01	-2.15716230+01	-1.32223940+03	-5.57394040+03
2.98750000+01	-2.15911600+01	-1.33033250+03	-6.07129760+03
3.02499990+01	-2.16106970+01	-1.33843270+03	-6.57169100+03
3.06250000+01	-2.16302350+01	-1.34654050+03	-7.07512340+03
3.09999990+01	-2.16497720+01	-1.35465540+03	-7.58159760+03
3.13750000+01	-2.16693100+01	-1.36277770+03	-8.09111630+03
3.17500000+01	-2.16888470+01	-1.37090740+03	-8.60368210+03
3.21250000+01	-2.17083850+01	-1.37904440+03	-9.11929790+03
3.25000000+01	-2.17279230+01	-1.38718870+03	-9.63796670+03
3.28750000+01	-2.17474600+01	-1.39534030+03	-1.01596906+04
3.32500000+01	-2.17669970+01	-1.40349920+03	-1.06844730+04
3.36250000+01	-2.17865350+01	-1.41166550+03	-1.12123164+04
3.40000000+01	-2.18060720+01	-1.41983910+03	-1.17432235+04
3.43750000+01	-2.18256100+01	-1.42802010+03	-1.22771970+04
3.47500000+01	-2.18451480+01	-1.43620830+03	-1.28142398+04
3.51250000+01	-2.18646850+01	-1.44440390+03	-1.33543545+04
3.55000000+01	-2.18842220+01	-1.45260680+03	-1.38975439+04
3.58749990+01	-2.19037600+01	-1.46081710+03	-1.44438110+04
3.62500000+01	-2.19232980+01	-1.46903460+03	-1.49931581+04

TABLE C-2. (Continued)

3.66249990+01	-2.19428350+01	-1.47725950+03	-1.55455882+04
3.70000000+01	-2.19623730+01	-1.48549180+03	-1.61011040+04
3.73749990+01	-2.19819100+01	-1.49373130+03	-1.66597080+04
3.77500000+01	-2.20014480+01	-1.50197820+03	-1.72214030+04
3.81249990+01	-2.20209850+01	-1.51023240+03	-1.77861930+04
3.85000000+01	-2.20405230+01	-1.51849390+03	-1.83540780+04
3.88749990+01	-2.20600610+01	-1.52676270+03	-1.89250640+04
3.92500000+01	-2.20795980+01	-1.53503890+03	-1.94991520+04
3.96249990+01	-2.20991350+01	-1.54332240+03	-2.00763440+04
4.00000000+01	-2.21186730+01	-1.55161320+03	-2.06565720+04

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	-2.21186730+01	8.51144080+02	-2.47270490+04
4.04999990+01	-2.21447230+01	8.40078230+02	-2.43043400+04
4.10000000+01	-2.21707730+01	8.28999360+02	-2.38870710+04
4.15000000+01	-2.21968230+01	8.17907460+02	-2.34753440+04
4.19999990+01	-2.22228730+01	8.06802540+02	-2.30691670+04
4.25000000+01	-2.22489230+01	7.95684600+02	-2.26685450+04
4.30000000+01	-2.22749730+01	7.84553620+02	-2.22734860+04
4.34999990+01	-2.23010230+01	7.73409630+02	-2.18839950+04
4.40000000+01	-2.23270730+01	7.62252610+02	-2.15000790+04
4.45000000+01	-2.23531230+01	7.51082560+02	-2.11217460+04
4.50000000+01	-2.23791730+01	7.39899490+02	-2.07490000+04
4.55000000+01	-2.24052240+01	7.28703400+02	-2.03818500+04
4.59999990+01	-2.24312730+01	7.17494280+02	-2.00203010+04
4.65000000+01	-2.24573230+01	7.06272130+02	-1.96643590+04
4.70000000+01	-2.24833730+01	6.95036960+02	-1.93140320+04
4.74999990+01	-2.25094240+01	6.83788770+02	-1.89693260+04
4.80000000+01	-2.25354730+01	6.72527550+02	-1.86302470+04
4.85000000+01	-2.25615230+01	6.61253300+02	-1.82968020+04
4.89999990+01	-2.25875740+01	6.49966030+02	-1.79689970+04
4.95000000+01	-2.26136240+01	6.38665740+02	-1.76468390+04
5.00000000+01	-2.06256220+01	6.27855930+02	-1.73301050+04

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000+01	-2.06256220+01	6.27855930+02	-1.73301930+04
5.05000000+01	-1.86409470+01	6.18039300+02	-1.70187920+04
5.10000000+01	-1.86694030+01	6.08711710+02	-1.67121050+04
5.14999990+01	-1.86978610+01	5.99369900+02	-1.64100840+04
5.20000000+01	-1.87263180+01	5.90013860+02	-1.61127388+04
5.25000000+01	-1.87547750+01	5.80643590+02	-1.58200745+04
5.29999990+01	-1.87832320+01	5.71259100+02	-1.55320990+04
5.35000000+01	-1.88116890+01	5.61860370+02	-1.52488191+04
5.40000000+01	-1.88401460+01	5.52447410+02	-1.49702422+04
5.44999990+01	-1.88686040+01	5.43020230+02	-1.46963754+04
5.50000000+01	-1.88970610+01	5.33578810+02	-1.44272257+04
5.55000000+01	-1.[illegible]9255180+01	5.24123170+02	-1.41628[illegible]03+04
5.59999990+01	-1.89539750+01	5.14655300+02	-1.39031063+04

TABLE C-2. (Continued)

5.650[illegible]00+01	-1.89824320+01	5.05169200+02	-1.36481507+04
5.7000[illegible]000+01	-1.90108900+01	4.95670860+02	-1.33979406+04
5.75000000+01	-1.90393460+01	4.86158310+02	-1.31524834+04
5.80000000+01	-1.90678040+01	4.76631520+02	-1.29117861+04
5.84999990+01	-1.90962610+01	4.67090500+02	-1.26758556+04
5.90000000+01	-1.91247180+01	4.57535260+02	-1.24446992+04
5.95000000+01	-1.91531750+01	4.47965790+02	-1.22183240+04
5.99999990+01	-1.91816320+01	4.38382090+02	-1.19967371+04
6.05000000+01	-1.92100890+01	4.28784160+02	-1.17799456+04
6.10000000+01	-1.92385460+01	4.19172000+02	-1.15679566+04
6.14999990+01	-1.92670030+01	4.09545620+02	-1.13607773+04
6.20000000+01	-1.92954610+01	3.99905010+02	-1.11584147+04
6.25000000+01	-1.93239170+01	3.90250170+02	-1.09608760+04
6.30000000+01	-1.93523750+01	3.80581100+02	-1.07681682+04
6.35000000+01	-1.93808320+01	3.70897790+02	-1.05802986+04
6.40000000+01	-1.94092890+01	3.61200270+02	-1.03972741+04
6.45000000+01	-1.94377460+01	3.51488510+02	-1.02191020+04
6.50000000+01	-1.94662030+01	3.41762520+02	-1.00457893+04
6.54999990+01	-1.94946600+01	3.32022310+02	-9.87734330+03
6.60000000+01	-1.95231180+01	3.22267860+02	-9.71377070+03
6.65000000+01	-1.95515740+01	3.12499190+02	-9.55507910+03
6.69999990+01	-1.95800320+01	3.02716280+02	-9.40127520+03
6.75000000+01	-1.96084890+01	2.92919160+02	-9.25236640+03
6.80000000+01	-1.96369460+01	2.83107800+02	-9.10835970+03
6.84999990+01	-1.96654030+01	2.73282220+02	-8.96926230+03
6.90000000+01	-1.96938600+01	2.63442400+02	-8.83508120+03
6.95000000+01	-1.97223170+01	2.53588360+02	-8.70582350+03
7.00000000+01	-1.97507750+01	2.43720090+02	-8.58141580+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	-1.97507750+01	6.61668310+02	-8.58149630+03
7.05000000+01	-1.97792310+0[illegible]	6.51785810+02	-8.25321350+03
7.09999990+01	-1.98076890+[illegible]	6.41889080+02	-7.92979480+03
7.15000000+01	-1.98361460+[illegible]	6.31978120+02	-7.61132800+03
7.20000000+01	-1.98646030+[illegible]1	6.22052940+02	-7.29782020+03
7.24999990+01	-1.98930600[illegible]1	6.12113520+02	-6.98927860+03
7.30000000+01	-1.99215170 01	6.02159880+02	-6.68571040+03
7.35000000+01	-1.99499740[illegible]01	5.92192010+02	-6.38712240+03
7.39999990+01	-1.99784320[illegible]01	5.82209910+02	-6.09352190+03
7.45000000+01	-2.0006888[illegible]01	5.72213580+02	-5.80491610+03
7.50000000+01	-2.0035346[illegible] 01	5.62203030+02	-5.52131200+03
7.55000000+01	-2.0063803[illegible] 01	5.52178250+02	-5.24271670+03
7.60000000+01	-2.00922600 01	5.42139240+02	-4.96913740+03
7.65000000+01	-2.01207170[illegible]01	5.32086010+02	-4.70058110+03
7.70000000+01	-2.01491740 [illegible]	5.22018540+02	-4.43705500+03
7.75000000+01	-2.01776310+[illegible]	5.11936840+02	-4.17856610+03
7.79999990+01	-2.02060880+0[illegible]	5.01840910+02	-3.92512180+03
7.85000000+01	-2.02345450+01	4.91730760+02	-3.67672880+03
7.90000000+01	-2.02630030+01	4.81606370+02	-3.43339460+03
7.94999990+01	-2.02914600+01	4.71467760+02	-3.19512610+03
8.00000000+01	-2.03199170+01	4.61314910+02	-2.96193040+03
8.05000000+01	-2.03483740+01	4.51147840+02	-2.73381480+03
8.09999990+01	-2.03768310+01	4.40966540+02	-2.51078610+03

TABLE C-2. (Continued)

8.15000000+01	-2.04052880+01	4.30771010+02	-2.29285180+03
8.20000000+01	-2.04337460+01	4.20561250+02	-2.08001870+03
8.25000000+01	-2.04622020+01	4.10337270+02	-1.87229420+03
8.30000000+01	-2.04906590+01	4.00099060+02	-1.66968510+03
8.34999990+01	-2.05191170+01	3.89846620+02	-1.47219870+03
8.40000000+01	-2.05475740+01	3.79579950+02	-1.27984200+03
8.45000000+01	-2.05760310+01	3.69299050+02	-1.09262230+03
8.49999990+01	-2.06044880+01	3.59003920+02	-9.10546590+02
8.55000000+01	-2.06329450+01	3.48694560+02	-7.33621970+02
8.60000000+01	-2.06614020+01	3.38370980+02	-5.61855590+02
8.64999990+01	-2.06898590+01	3.28033160+02	-3.95254560+02
8.70000000+01	-2.07183170+01	3.17681120+02	-2.33825990+02
8.75000000+01	-2.07467730+01	3.07314850+02	-7.75769990+01
8.80000000+01	-2.07752310+01	2.96934340+02	7.34853010+01
8.85000000+01	-2.08036880+01	2.86539610+02	2.19353790+02
8.90000000+01	-2.08321450+01	2.76130660+02	3.60021360+02
8.95000000+01	-2.08606020+01	2.65707480+02	4.95480900+02
9.00000000+01	-2.08890590+01	2.55270060+02	6.25805940+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	-2.29778220+01	-3.02177150+02	6.25725290+02
9.04999990+01	-1.97636400+01	-3.12862520+02	4.71911260+02
9.10000000+01	-1.65535320+01	-3.21941810+02	3.13236740+02
9.15000000+01	-1.33483715+01	-3.29417280+02	1.50423510+02
9.19999990+01	-1.01467591+01	-3.35291070+02	-1.57270199+01
9.25000000+01	-6.94921990+00	-3.39565050+02	-1.84400220+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 1
SEGMENT 7

STATION	LOAD	SHEAR	MOMENT
9.25000000+01	-6.94921990+00	5.41570740+01	-1.84414500+02
9.30000000+01	-6.98785990+00	5.06728040+01	-1.58221310+02
9.34999990+01	-7.02649990+00	4.71692140+01	-1.33760800+02
9.40000000+01	-7.06513990+00	4.36463050+01	-1.11056928+02
9.45000000+01	-7.10377980+00	4.01040750+01	-9.01193340+01
9.50000000+01	-7.14241990+00	3.65425250+01	-7.09576850+01
9.55000000+01	-7.18105990+00	3.29616550+01	-5.35816390+01
9.60000000+01	-7.21969980+00	2.93614660+01	-3.80008590+01
9.65000000+01	-7.25833990+00	2.57419560+01	-2.42250030+01
9.70000000+01	-7.29697990+00	2.21031260+01	-1.22637324+01
9.74999990+01	-7.33561990+00	1.84449770+01	-2.12670650+00
9.80000000+01	-7.37425980+00	1.47675073+01	6.17641460+00
9.85000000+01	-7.41289990+00	1.10707174+01	1.26359707+01
9.89999990+01	-7.45153980+00	7.35460760+00	1.72423010+01
9.95000000+01	-7.49017980+00	3.61917770+00	1.99857470+01
1.00000000+02	-7.52881990+00	-1.35572220-01	2.08709290+01

0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT

TABLE C-2. (Continued)

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     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
     0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL =      .27929792+01
DELARL =      .27929792+01
ADJUSTED SUMMED AERO FORCE COEFF =      -.12061121+01
ADJUSTED SUMMED AERO MOMENT COEFF =       .60310277-00
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  1
   -.27930+01  -.28121+01  -.29460+01  -.32781+01  -.36644+01  -.39669+01
   -.45381+01  -.49730+01  -.55107+01  -.61194+01  -.67451+01  -.73057+01
   -.79446+01  -.85791+01  -.90482+01  -.97105+01  -.10190+02  -.10393+02
   -.10719+02  -.10991+02  -.11376+02  -.11679+02  -.11352+02  -.11400+02
   -.11130+02  -.10915+02  -.10813+02  -.10537+02  -.10057+02  -.95532+01
   -.92897+01  -.89119+01  -.82483+01  -.75504+01  -.70354+01  -.62347+01
   -.54488+01  -.45817+01  -.37158+01  -.31391+01  -.28253+01
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  2
   -.28253+01  -.28043+01  -.27834+01  -.27624+01  -.27415+01  -.27206+01
   -.26996+01  -.26787+01  -.26577+01  -.26368+01  -.26158+01  -.25949+01
   -.25739+01  -.25530+01  -.25320+01  -.25111+01  -.24901+01  -.24692+01
   -.24482+01  -.24273+01  -.24063+01  -.23854+01  -.23644+01  -.23435+01
   -.23226+01  -.23016+01  -.22807+01  -.22597+01  -.22388+01  -.22178+01
   -.21969+01  -.21759+01  -.21550+01  -.21340+01  -.21131+01  -.20921+01
   -.20712+01  -.20502+01  -.20293+01  -.20083+01  -.19874+01
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  3
   -.19874+01  -.19595+01  -.19315+01  -.19036+01  -.18757+01  -.18477+01
   -.18198+01  -.17919+01  -.17640+01  -.17360+01  -.17081+01  -.16802+01
   -.16522+01  -.16243+01  -.15964+01  -.15685+01  -.15405+01  -.15126+01
   -.14847+01  -.14567+01  -.14288+01
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  4
   -.14288+01  -.14009+01  -.13729+01  -.13450+01  -.13171+01  -.12892+01
   -.12612+01  -.12333+01  -.12054+01  -.11774+01  -.11495+01  -.11216+01
   -.10936+01  -.10657+01  -.10378+01  -.10099+01  -.98193-00  -.95400-00
   -.92607-00  -.89814-00  -.87021-00  -.84228-00  -.81435-00  -.78642-00
   -.75849-00  -.73056-00  -.70263-00  -.67470-00  -.64677-00  -.61884-00
   -.59091-00  -.56298-00  -.53505-00  -.50712-00  -.47919-00  -.45126-00
   -.42333-00  -.39540-00  -.36747-00  -.33954-00  -.31161-00
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  5
   -.31161-00  -.28368-00  -.25575-00  -.22782-00  -.19989-00  -.17196-00
   -.14403-00  -.11610+00  -.88172-01  -.60242-01  -.32312-01  -.43826-02
    .23547-01   .51477-01   .79407-01   .10734+00   .13527-00   .16320-00
    .19113-00   .21906-00   .24699-00   .27492-00   .30285-00   .33077-00
    .35870-00   .38663-00   .41456-00   .44249-00   .47042-00   .49835-00
    .52628-00   .55421-00   .58214-00   .61007-00   .63800-00   .66593-00
    .69386-00   .72179-00   .74972-00   .77765-00   .80558-00
     0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
    .22344+01   .22623+01   .22902+01   .23182+01   .23461+01   .23740+01
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TABLE C-2. (Continued)

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    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
   .23740+01   .24020+01   .24299+01   .24578+01   .24858+01   .25137+01
   .25416+01   .25695+01   .25975+01   .26254+01   .26533+01   .26813+01
   .27092+01   .27371+01   .27650+01   .27930+01
CONCENTRATED AERO FORCES AND MOMENTS
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
  -.26932+03   .00000
   .00000      .00000
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
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    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 MOMENT POINTS FELL OFF YOUR PLOT

CASE       1
PLANE      2
SEGMENT     1
```

STATION	LOAD	SHEAR	MOMENT
0.00000000	-1.12347775+00	0.00000000	9.80826910-03
6.25000000-01	-6.73707990-01	-5.61620540-01	-1.50358560-01
1.25000000+00	-3.39738610-01	-8.78322600-01	-5.94809030-01
1.87500000+00	-2.04573720-01	-1.04842019+00	-1.19138438+00
2.50000000+00	-1.24627798-01	-1.15129566+00	-1.87326493+00
3.12500000+00	3.82732750-02	-1.17828144+00	-2.59572600+00
3.75000000+00	-6.82889820-02	-1.18766134+00	-3.32955140+00
4.37500000+00	-3.94678710-02	-1.22133536+00	-4.07683220+00
5.00000000+00	-1.14293217-01	-1.26938569+00	-4.84965070+00
5.62500000+00	-2.60911580-01	-1.38663719+00	-5.67412610+00
6.25000000+00	-4.25448300-01	-1.60112465+00	-6.60226990+00
6.87500000+00	-5.25680360-01	-1.89835235+00	-7.69032570+00
7.50000000+00	-7.05134690-01	-2.28298200+00	-8.99146090+00
8.12500000+00	-8.80678530-01	-2.77854870+00	-1.05676575+01
8.75000000+00	-8.92500880-01	-3.33266720+00	-1.24718818+01
9.37500000+00	-1.09770715+00	-3.95460720+00	-1.47436231+01
1.00000000+01	-1.12087595+00	-4.64791440+00	-1.74263790+01
1.06250000+01	-8.68848800-01	-5.26970330+00	-2.05201080+01
1.12500000+01	-7.41011860-01	-5.77278480+00	-2.39653480+01
1.18750000+01	-5.58406830-01	-6.17885310+00	-2.76947070+01
1.25000000+01	-4.91240980-01	-6.50686810+00	-3.16534560+01
1.31250000+01	-3.41481920-01	-6.76709400+00	-3.57960420+01
1.37500000+01	4.36100960-01	-6.73752550+00	-4.00107080+01
1.43750000+01	8.38314290-01	-6.33927080+00	-4.40916680+01

TABLE C-2. (Continued)

1.50000000+01	1.55704808+00	-5.59072000+00	-4.78142630+01
1.56250000+01	2.22121020+00	-4.41001430+00	-5.09339650+01
1.62499990+01	2.77079080+00	-2.85001400+00	-5.31971850+01
1.68750000+01	3.49252100+00	-8.92729070-01	-5.43612650+01
1.75000000+01	4.41932310+00	1.57972219+00	-5.41410420+01
1.81250000+01	5.36813630+00	4.63830320+00	-5.21923810+01
1.87500000+01	6.07606230+00	8.21461520+00	-4.81703170+01
1.93749990+01	6.89670300+00	1.22686043+01	-4.17637730+01
2.00000000+01	8.00299640+00	1.69247600+01	-3.26353190+01
2.06250000+01	9.14273260+00	2.22828000+01	-2.03774290+01
2.12500000+01	1.00987327+01	2.82957580+01	-4.56609170+00
2.18750000+01	1.13389065+01	3.49950200+01	1.52178040+01
2.24999990+01	1.25641104+01	4.24647130+01	3.94295080+01
2.31250000+01	1.38696217+01	5.07252540+01	6.85569000+01
2.37500000+01	1.51731410+01	5.98011170+01	1.03101916+02
2.43750000+01	1.61858860+01	6.96008120+01	1.43545550+02
2.50000000+01	1.69356200+01	7.99512830+01	1.90165680+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	1.69356200+01	-5.87877610+02	1.90237930+02
2.53750000+01	1.69454810+01	-5.81524510+02	-2.89526200+01
2.57499990+01	1.69553440+01	-5.75168110+02	-2.45832490+02
2.61250000+01	1.69652050+01	-5.68808010+02	-4.60328010+02
2.64999990+01	1.69750680+01	-5.62444210+02	-6.72437790+02
2.68750000+01	1.69849290+01	-5.56076720+02	-8.82160470+02
2.72499990+01	1.69947910+01	-5.49705530+02	-1.08949460+03
2.76250000+01	1.70046530+01	-5.43330630+02	-1.29443890+03
2.79999990+01	1.70145150+01	-5.36952040+02	-1.49699190+03
2.83750000+01	1.70243770+01	-5.30569750+02	-1.69715220+03
2.87499990+01	1.70342390+01	-5.24183770+02	-1.89491850+03
2.91250000+01	1.70441020+01	-5.17794080+02	-2.09028940+03
2.94999990+01	1.70539630+01	-5.11400690+02	-2.28326340+03
2.98750000+01	1.70638260+01	-5.05003610+02	-2.47383910+03
3.02499990+01	1.70736870+01	-4.98602830+02	-2.66201530+03
3.06250000+01	1.70835490+01	-4.92198350+02	-2.84779050+03
3.09999990+01	1.70934110+01	-4.85790170+02	-3.03116340+03
3.13750000+01	1.71032730+01	-4.79378290+02	-3.21213250+03
3.17500000+01	1.71131350+01	-4.72962720+02	-3.39069630+03
3.21250000+01	1.71229970+01	-4.66543450+02	-3.56685380+03
3.25000000+01	1.71328590+01	-4.60120480+02	-3.74060330+03
3.28750000+01	1.71427210+01	-4.53693810+02	-3.91194340+03
3.32500000+01	1.71521840+01	-4.47263440+02	-4.08087280+03
3.36250000+01	1.71624450+01	-4.40829370+02	-4.24739030+03
3.40000000+01	1.71723070+01	-4.34391610+02	-4.41149420+03
3.43750000+01	1.71821690+01	-4.27950140+02	-4.57318320+03
3.47500000+01	1.71920310+01	-4.21504990+02	-4.73245610+03
3.51250000+01	1.72018930+01	-4.15056120+02	-4.88931120+03
3.55000000+01	1.72117550+01	-4.08603570+02	-5.04374740+03
3.58749990+01	1.72216170+01	-4.02147320+02	-5.19576310+03
3.62500000+01	1.72314790+01	-3.95687360+02	-5.34535710+03
3.66249990+01	1.72413410+01	-3.89223710+02	-5.49252790+03
3.70000000+01	1.72512030+01	-3.82756360+02	-5.63727410+03
3.73749990+01	1.72610650+01	-3.76285310+02	-5.77959430+03

TABLE C-2. (Continued)

3.77500000+01	1.72709270+01	-3.69810560+02	-5.91948730+03
3.81249990+01	1.72807890+01	-3.63332120+02	-6.05695150+03
3.85000000+01	1.72906510+01	-3.56849980+02	-6.19198560+03
3.88749990+01	1.73005130+01	-3.50364130+02	-6.32458820+03
3.92500000+01	1.73103750+01	-3.43874600+02	-6.45475800+03
3.96249990+01	1.73202370+01	-3.37381360+02	-6.58249340+03
4.00000000+01	1.73300990+01	-3.30884420+02	-6.70786550+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	1.73300990+01	-2.80132060+02	-6.70776920+03
4.04999990+01	1.73432480+01	-2.71463730+02	-6.84557180+03
4.10000000+01	1.73563970+01	-2.62788820+02	-6.97913480+03
4.15000000+01	1.73695470+01	-2.54107330+02	-7.10835890+03
4.19999990+01	1.73826960+01	-2.45419270+02	-7.23324050+03
4.25000000+01	1.73958450+01	-2.36724640+02	-7.35377650+03
4.30000000+01	1.74089950+01	-2.28023430+02	-7.46996350+03
4.34999990+01	1.74221440+01	-2.19315640+02	-7.58179820+03
4.40000000+01	1.74352930+01	-2.10601290+02	-7.68927740+03
4.45000000+01	1.74484420+01	-2.01880350+02	-7.79239770+03
4.50000000+01	1.74615920+01	-1.93152840+02	-7.89115600+03
4.55000000+01	1.74747410+01	-1.84418760+02	-7.98554890+03
4.59999990+01	1.74878900+01	-1.75678100+02	-8.07557310+03
4.65000000+01	1.75010400+01	-1.66930870+02	-8.16122520+03
4.70000000+01	1.75141890+01	-1.58177060+02	-8.24250230+03
4.74999990+01	1.75273390+01	-1.49416680+02	-8.31940060+03
4.80000000+01	1.75404880+01	-1.40649720+02	-8.39191720+03
4.85000000+01	1.75536370+01	-1.31876190+02	-8.46004870+03
4.89999990+01	1.75667870+01	-1.23096089+02	-8.52379170+03
4.95000000+01	1.75799350+01	-1.14309409+02	-8.58314310+03
5.00000000+01	1.60438140+01	-1.05903472+02	-8.63830030+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000+01	1.60438140+01	-1.05903472+02	-8.63821180+03
5.05000000+01	1.45108057+01	-9.82648180+01	-8.68918100+03
5.10000000+01	1.45263621+01	-9.10055260+01	-8.73649850+03
5.14999990+01	1.45419184+01	-8.37384570+01	-8.78018450+03
5.20000000+01	1.45574750+01	-7.64636080+01	-8.82023480+03
5.25000000+01	1.45730313+01	-6.91809830+01	-8.85664600+03
5.29999990+01	1.45885877+01	-6.18905780+01	-8.88941380+03
5.35000000+01	1.46041440+01	-5.45923950+01	-8.91853450+03
5.40000000+01	1.46197006+01	-4.72864340+01	-8.94400410+03
5.44999990+01	1.46352569+01	-3.99726940+01	-8.96581880+03
5.50000000+01	1.46508134+01	-3.26511770+01	-8.98397[illegible]+03
5.55000000+01	1.46663698+01	-2.53218810+01	-8.99846700+03
5.59999990+01	1.46819262+01	-1.79848070+01	-9.00929450+03
5.65000000+01	1.46974825+01	-1.06399556+01	-9.01645060+03
5.70000000+01	1.47130391+01	-3.28732540+00	-9.01993240+03
5.75000000+01	1.47285954+01	4.07308320+00	-9.01973610+03

TABLE C-2. (Continued)

5.60000000+01	1.47441518+01	1.14412699+01	-9.01585750+03
5.84999990+01	1.47597083+01	1.88172350+01	-9.00829290+03
5.90000000+01	1.47752645+01	2.62009780+01	-8.99703850+03
5.95000000+01	1.47908210+01	3.35924990+01	-8.98209010+03
5.99999990+01	1.48063774+01	4.09917990+01	-8.96344410+03
6.05000000+01	1.48219338+01	4.83988760+01	-8.94109640+03
6.10000000+01	1.48374901+01	5.58137320+01	-8.91504330+03
6.14999990+01	1.48530468+01	6.32363660+01	-8.88528090+03
6.20000000+01	1.48686030+01	7.06667780+01	-8.85180520+03
6.25000000+01	1.48841595+01	7.81049680+01	-8.81461230+03
6.30000000+01	1.48997159+01	8.55509370+01	-8.77369840+03
6.35000000+01	1.49152722+01	9.30046840+01	-8.72905950+03
6.40000000+01	1.49308288+01	1.00466208+02	-8.68069190+03
6.45000000+01	1.49463851+01	1.07935512+02	-8.62859150+03
6.50000000+01	1.49619415+01	1.15412592+02	-8.57275450+03
6.54999990+01	1.49774979+01	1.22897452+02	-8.51317730+03
6.60000000+01	1.49930544+01	1.30390090+02	-8.44985540+03
6.65000000+01	1.50086107+01	1.37890500+02	-8.38278540+03
6.69999990+01	1.50241671+01	1.45398700+02	-8.31196310+03
6.75000000+01	1.50397235+01	1.52914670+02	-8.23738490+03
6.80000000+01	1.50552800+01	1.60438420+02	-8.15904660+03
6.84999990+01	1.50708363+01	1.67969950+02	-8.07694460+03
6.90000000+01	1.50863929+01	1.75509250+02	-7.99107480+03
6.95000000+01	1.51019492+01	1.83056340+02	-7.90143350+03
7.00000000+01	1.51175056+01	1.90611210+02	-7.80809720+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	1.51175056+01	2.15987380+02	-7.80801660+03
7.05000000+01	1.51330620+01	2.23550020+02	-7.69805160+03
7.09999990+01	1.51486185+01	2.31120440+02	-7.58438400+03
7.15000000+01	1.51641748+01	2.38698640+02	-7.46692930+03
7.20000000+01	1.51797312+01	2.46284610+02	-7.34568350+03
7.24999990+01	1.51952877+01	2.53878370+02	-7.22064280+03
7.30000000+01	1.52108439+01	2.61479900+02	-7.09180330+03
7.35000000+01	1.52264004+01	2.69089210+02	-6.95916100+03
7.39999990+01	1.52419568+01	2.76706290+02	-6.82271210+03
7.45000000+01	1.52575133+01	2.84331170+02	-6.68245280+03
7.50000000+01	1.52730697+01	2.91963810+02	-6.53837900+03
7.55000000+01	1.52886262+01	2.99604230+02	-6.39048710+03
7.60000000+01	1.53041824+01	3.07252430+02	-6.23877300+03
7.65000000+01	1.53197388+01	3.14908410+02	-6.08323280+03
7.70000000+01	1.53352952+01	3.22572160+02	-5.92386270+03
7.75000000+01	1.53508517+01	3.30243710+02	-5.76065880+03
7.79999990+01	1.53664080+01	3.37923020+02	-5.59361720+03
7.85000000+01	1.53819644+01	3.45610110+02	-5.42273390+03
7.90000000+01	1.53975209+01	3.53304980+02	-5.24800520+03
7.94999990+01	1.54130771+01	3.61007620+02	-5.06942700+03
8.00000000+01	1.54286336+01	3.68718050+02	-4.88699560+03
8.05000000+01	1.54441902+01	3.76436260+02	-4.70070700+03
8.09999990+01	1.54597465+01	3.84162240+02	-4.51055750+03
8.15000000+01	1.54753029+01	3.91896000+02	-4.31654300+03
8.20000000+01	1.54908594+01	3.99637540+02	-4.11865960+03
8.25000000+01	1.55064156+01	4.07386850+02	-3.91690350+03

TABLE C-2. (Continued)

8.30000000+01	1.55219721+01	4.15143950+02	-3.71127080+03
8.34999990+01	1.55375286+01	4.22908830+02	-3.50175760+03
8.40000000+01	1.55530849+01	4.30681480+02	-3.28836010+03
8.45000000+01	1.55686414+01	4.38461910+02	-3.07107430+03
8.49999990+01	1.55841977+01	4.46250120+02	-2.84989630+03
8.55000000+01	1.55997541+01	4.54046100+02	-2.62482230+03
8.60000000+01	1.56153105+01	4.61849870+02	-2.39584830+03
8.64999990+01	1.56308670+01	4.69661410+02	-2.16297050+03
8.70000000+01	1.56464233+01	4.77480730+02	-1.92618490+03
8.75000000+01	1.56619799+01	4.85307830+02	-1.68548780+03
8.80000000+01	1.56775362+01	4.93142710+02	-1.44087520+03
8.85000000+01	1.56930926+01	5.00985360+02	-1.19234320+03
8.90000000+01	1.57086490+01	5.08835790+02	-9.39887900+02
8.95000000+01	1.57242055+01	5.16694010+02	-6.83505450+02
9.00000000+01	1.57397618+01	5.24560000+02	-4.23272610+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	1.71685640+01	2.02717540+02	-4.23191960+02
9.04999990+01	1.47278529+01	2.10691640+02	-3.19785550+02
9.10000000+01	1.22912155+01	2.17446400+02	-2.12777590+02
9.15000000+01	9.85931340+00	2.22984040+02	-1.02696536+02
9.19999990+01	7.43108700+00	2.27305630+02	9.84958150+00
9.25000000+01	5.00693370+00	2.30416140+02	1.24239446+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 1
PLANE 2
SEGMENT 7

STATION	LOAD	SHEAR	MOMENT
9.25000000+01	5.00693370+00	-3.89064560+01	1.24253724+02
9.30000000+01	5.03267300+00	-3.63965540+01	1.05442252+02
9.34999990+01	5.05841230+00	-3.38737830+01	8.78746690+01
9.40000000+01	5.08415160+00	-3.13381430+01	7.15716880+01
9.45000000+01	5.10989080+00	-2.87896320+01	5.65397440+01
9.50000000+01	5.13563010+00	-2.62282520+01	4.27852730+01
9.55000000+01	5.16136940+00	-2.36540020+01	3.03147100+01
9.60000000+01	5.18710870+00	-2.10668820+01	1.91344890+01
9.65000000+01	5.21284800+00	-1.84668940+01	9.25104480+00
9.70000000+01	5.23858730+00	-1.58540351+01	6.70812530-01
9.74999990+01	5.26432660+00	-1.32283067+01	-6.59977300+00
9.80000000+01	5.29006580+00	-1.05897086+01	-1.25542768+01
9.85000000+01	5.31580520+00	-7.93824100+00	-1.71862640+01
9.89999990+01	5.34154440+00	-5.27390360+00	-2.04892990+01
9.95000000+01	5.36728370+00	-2.59669660+00	-2.24569500+01
1.00000000+02	5.39302300+00	9.33800640-02	-2.30970580+01

TABLE C-2. (Continued)

RESULTANT LOADS, CASE 1
SEGMENT 1

STATION	SHEAR	MOMENT
0.00000000	0.00000000	1.38703823-02
6.25000000-01	1.18130011+00	3.35230630-01
1.25000000+00	1.97933386+00	1.31533606+00
1.87500000+00	2.57058520+00	2.72917060+00
2.50000000+00	3.09686440+00	4.49106540+00
3.12500000+00	3.54588130+00	6.55552850+00
3.75000000+00	4.01992270+00	8.90532020+00
4.37500000+00	4.58965580+00	1.15781387+01
5.00000000+00	5.23690550+00	1.46286514+01
5.62500000+00	6.05108370+00	1.81347680+01
6.25000000+00	7.07642020+00	2.22170490+01
6.87500000+00	8.28815210+00	2.70013790+01
7.50000000+00	9.69403890+00	3.26071250+01
8.12500000+00	1.13336251+01	3.91677720+01
8.75000000+00	1.31204035+01	4.68014150+01
9.37500000+00	1.50698193+01	5.56037220+01
1.00000000+01	1.71878890+01	6.56773570+01
1.06250000+01	1.92344270+01	7.70522600+01
1.12500000+01	2.11291580+01	8.96587550+01
1.18750000+01	2.29083780+01	1.03413547+02
1.25000000+01	2.46042900+01	1.18254375+02
1.31250000+01	2.62345940+01	1.34134310+02
1.37500000+01	2.74304190+01	1.50895630+02
1.43750000+01	2.80678270+01	1.68223920+02
1.50000000+01	2.81907930+01	1.85775120+02
1.56250000+01	2.76885430+01	2.03175770+02
1.62499990+01	2.66849180+01	2.20043140+02
1.68750000+01	2.52116800+01	2.36021070+02
1.75000000+01	2.32070890+01	2.50695040+02
1.81250000+01	2.08236580+01	2.63571990+02
1.87500000+01	1.86445630+01	2.74186130+02
1.93749990+01	1.75306070+01	2.82167480+02
2.00000000+01	1.85009700+01	2.87162910+02
2.06250000+01	2.23294460+01	2.88802650+02
2.12500000+01	2.88252030+01	2.86845920+02
2.18750000+01	3.74725500+01	2.81310160+02
2.24999990+01	4.80014720+01	2.72578400+02
2.31250000+01	6.02292400+01	2.61703480+02
2.37500000+01	7.40744490+01	2.50911810+02
2.43750000+01	8.93118580+01	2.44231400+02
2.50000000+01	1.05597275+02	2.47662810+02

SEGMENT 2

STATION	SHEAR	MOMENT
2.50000000+01	1.35938480+03	2.47672010+02
2.53750000+01	1.36388630+03	3.04000060+02
2.57499990+01	1.36845450+03	8.05202710+02
2.61250000+01	1.37308870+03	1.31697390+03
2.64999990+01	1.37778860+03	1.83193530+03
2.68750000+01	1.38255360+03	2.34915150+03
2.72499990+01	1.38738320+03	2.86837150+03
2.76250000+01	1.39227700+03	3.38950850+03
2.79999990+01	1.39723450+03	3.91253150+03
2.83750000+01	1.40225510+03	4.43743260+03

TABLE C-2. (Continued)

2.87499990+01	1.40733850+03	4.96421510+03
2.91250000+01	1.41248390+03	5.49288760+03
2.94999990+01	1.41769100+03	6.02346270+03
2.98750000+01	1.42295920+03	6.55595410+03
3.02499990+01	1.42828810+03	7.09037710+03
3.06250000+01	1.43367720+03	7.62674790+03
3.09999990+01	1.43912590+03	8.16508260+03
3.13750000+01	1.44463380+03	8.70[illegible]9810+03
3.17500000+01	1.45020020+03	9.24771140+03
3.21250000+01	1.45582430+03	9.79203950+03
3.25000000+01	1.46150720+03	1.03383998+04
3.28750000+01	1.46724660+03	1.08868092+04
3.32500000+01	1.47304270+03	1.14372849+04
3.36250000+01	1.47889490+03	1.19898439+04
3.40000000+01	1.48480270+03	1.25445038+04
3.43750000+01	1.49076580+03	1.31012812+04
3.47500000+01	1.49678350+03	1.36601932+04
3.51250000+01	1.50285530+03	1.42212569+04
3.55000000+01	1.50898090+03	1.47844889+04
3.58749990+01	1.51515970+03	1.53499063+04
3.62500000+01	1.52139120+03	1.59175258+04
3.66249990+01	1.52767490+03	1.64873640+04
3.70000000+01	1.53401050+03	1.70594370+04
3.7[illegible]49990+01	1.54039730+03	1.76337620+04
3.77500000+01	1.54683490+03	1.82103560+04
3.81249990+01	1.55332290+03	1.87892340+04
3.85000000+01	1.55986070+03	1.93704120+04
3.88749990+01	1.56644800+03	1.99539090+04
3.92500000+01	1.57308430+03	2.05397370+04
3.96249990+01	1.57976900+03	2.11279160+04
4.00000000+01	1.58650180+03	2.17184130+04

SEGMENT 3

STATION	SHEAR	MOMENT
4.00000000+01	8.96058130+02	2.56207160+04
4.04999990+01	8.82849920+02	2.52500060+04
4.10000000+01	8.69653890+02	2.48857480+04
4.15000000+01	8.56471340+02	2.45279540+04
4.19999990+01	8.43303600+02	2.41765630+04
4.25000000+01	8.30152110+02	2.38315120+04
4.30000000+01	8.17018400+02	2.34927330+04
4.34999990+01	8.03904100+02	2.31601580+04
4.40000000+01	7.90810940+02	2.28337120+04
4.45000000+01	7.77740750+02	2.25133200+04
4.50000000+01	7.64695540+02	2.21989040+04
4.55000000+01	7.51677400+02	2.18903810+04
4.59999990+01	7.38688580+02	2.15876650+04
4.65000000+01	7.25731520+02	2.12906700+04
4.70000000+01	7.12808770+02	2.09993010+04
4.74999990+01	6.99923160+02	2.07134680+04
4.80000000+01	6.87077610+02	2.04330710+04
4.85000000+01	6.74275350+02	2.01580100+04
4.89999990+01	6.61519830+02	1.98881840+04
4.95000000+01	6.48814740+02	1.96234880+04
5.00000000+01	6.36724900+02	1.93636970+04

SEGMENT 4

STATION	SHEAR	MOMENT

TABLE C-2. (Continued)

5.00000000+01	6.36724900+02	1.93637360+04
5.05000000+01	6.25802320+02	1.91086660+04
5.10000000+01	6.15477010+02	1.88579120+04
5.14999990+01	6.05191220+02	1.86113540+04
5.20000000+01	5.94947920+02	1.83689110+04
5.25000000+01	5.84750350+02	1.81304970+04
5.29999990+01	5.74601930+02	1.78960260+04
5.35000000+01	5.64506320+02	1.76654110+04
5.40000000+01	5.54467440+02	1.74385590+04
5.44999990+01	5.44489470+02	1.72153810+04
5.50000000+01	5.34576880+02	1.69957820+04
5.55000000+01	5.24734490+02	1.677967[illegible]0+04
5.59999990+01	5.14967430+02	1.656694[illegible]0+04
5.65000000+01	5.05281230+02	1.63575179+04
5.70000000+01	4.95681760+02	1.61512845+04
5.75000000+01	4.86175370+02	1.59481489+04
5.80000000+01	4.76768820+02	1.57480126+04
5.84999990+01	4.67469390+02	1.55507767+04
5.90000050+01	4.58284850+02	1.53563418+04
5.95000000+01	4.49223550+02	1.51646[illegible]4+04
5.99999990+01	4.40294420+02	1.49754[illegible]+04
6.05000000+01	4.31507010+02	1.47888579+04
6.10000000+01	4.22871540+02	1.46046435+04
6.14999990+01	4.14398900+02	1.44227415+04
6.20000000+01	4.06100740+02	1.42430569+04
6.25000000+01	3.97989410+02	1.40654964+04
6.30000000+01	3.90078110+02	1.38899685+04
6.35000000+01	3.82380750+02	1.37163841+04
6.40000000+01	3.74912110+02	1.35446564+04
6.45000000+01	3.67687700+02	1.33747014+04
6.50000000+01	3.60723340+02	1.32064379+04
6.54999990+01	3.54037560+02	1.30397887+04
6.60000000+01	3.47646590+02	1.28746803+04
6.65000000+01	3.41569220+02	1.27110433+04
6.69999990+01	3.35824250+02	1.25488127+04
6.75000000+01	3.30430830+02	1.23879292+04
6.80000000+01	3.25408230+02	1.22283382+04
6.84999990+01	3.20775740+02	1.20699915+04
6.90000000+01	3.16552360+02	1.19128473+04
6.95000000+01	3.12756580+02	1.17568707+04
7.00000000+01	3.09406060+02	1.16020290+04
SEGMENT 5		
STATION	SHEAR	MOMENT
7.00000000+01	6.96028370+02	1.16020344+04
7.05000000+01	6.89056850+02	1.12860767+04
7.09999990+01	6.82230350+02	1.09728994+04
7.15000000+01	6.75554130+02	1.06624266+04
7.20000000+01	6.69033610+02	1.03545759+04
7.24999990+01	6.62674270+02	1.00492635+04
7.30000000+01	6.56481720+02	9.74640410+03
7.35000000+01	6.50461660+02	9.44591190+03
7.39999990+01	6.44619840+02	9.14769970+03
7.45000000+01	6.38962120+02	8.85167920+03
7.50000000+01	6.33494360+02	8.55776170+03
7.55000000+01	6.28222500+02	8.26585760+03
7.60000000+01	6.23152470+02	7.97587700+03
7.65000000+01	6.18290240+02	7.68772940+03

TABLE C-2. (Continued)

7.70000000+01	6.13641720+02	7.40132470+03
7.75000000+01	6.09212800+02	7.11657250+03
7.79999990+01	6.05009310+02	6.83338370+03
7.85000000+01	6.01037000+02	6.55166980+03
7.90000000+01	5.97301510+02	6.27134410+03
7.94999990+01	5.93808340+02	5.99232180+03
8.00000000+01	5.90562820+02	5.71452160+03
8.05000000+01	5.87570110+02	5.43786620+03
8.09999990+01	5.84835110+02	5.16228390+03
8.15000000+01	5.82362550+02	4.88771030+03
8.20000000+01	5.80156810+02	4.61409080+03
8.25000000+01	5.78222040+02	4.34138440+03
8.30000000+01	5.76562010+02	4.06956750+03
8.34999990+01	5.75180200+02	3.79864130+03
8.40000000+01	5.74079670+02	3.52864100+03
8.45000000+01	5.73263140+02	3.25965030+03
8.49999990+01	5.72732900+02	2.99182280+03
8.55000000+01	5.72490830+02	2.72541600+03
8.60000000+01	5.72538400+02	2.46084750+03
8.64999990+01	5.72876590+02	2.19878770+03
8.70000000+01	5.73506010+02	1.94032540+03
8.75000000+01	5.74426760+02	1.68727210+03
8.80000000+01	5.75638540+02	1.44274790+03
8.85000000+01	5.77140610+02	1.21235240+03
8.90000000+01	5.78931780+02	1.00648130+03
8.95000000+01	5.81010460+02	8.44204370+02
9.00000000+01	5.83374660+02	7.55508290+02

SEGMENT 6

STATION	SHEAR	MOMENT
9.00000000+01	3.63675570+02	7.55396290+02
9.04999990+01	3.77192150+02	5.70055290+02
9.10000000+01	3.86496410+02	3.78670770+02
9.15000000+01	3.97790930+02	1.82136800+02
9.19999990+01	4.05078260+02	1.85567610+01
9.25000000+01	4.10360840+02	2.22348560+02

SEGMENT 7

STATION	SHEAR	MOMENT
9.25000000+01	6.60835870+01	2.22368370+02
9.30000000+01	6.23894400+01	1.90136920+02
9.34999990+01	5.80720920+01	1.60043460+02
9.40000000+01	5.37315470+01	1.32121710+02
9.45000000+01	4.93678000+01	1.06387202+02
9.50000000+01	4.49808550+01	8.28587500+01
9.55000000+01	4.05707110+01	6.15627620+01
9.60000000+01	3.61373060+01	4.25463730+01
9.65000000+01	3.16808220+01	2.59313050+01
9.70000000+01	2.72010770+01	1.22820648+01
9.74999990+01	2.26981330+01	6.93396590+00
9.80000000+01	1.81719890+01	1.39913530+01
9.85000000+01	1.36226448+01	2.13315590+01
9.89999990+01	9.05010000+00	2.67788790+01
9.95000000+01	4.45435520+00	3.00623470+01
1.00000000+02	1.64619750-01	3.11298850+01

TABLE C-2. (Continued)

HANGER LOADS ON MISSILE, UP AND STARB'D ARE POSITIVE
CASE 2

MISSILE CHARACTERISTICS

WEIGHT = .20000+03 LBS
PITCH INERTIA = .12000+06 LB'IN**2
YAW INERTIA = .12000+06 LB'IN**2
REFERENCE AREA = .78540+02 SQ.IN

HANGER DIMENSIONS, INCHES AND DEGREES

RADIUS	H	C	E
.5000+01	.1000+01	.1200+01	.5000-00

CANT ANGLE = .45000+02 DEGREES
SWAY BRACE ANGLES, DEGREES

FOWD BETA	AFT BETA
.3000+02	.3000+02

CG STA.	FSBSTA	RSBSTA	F HGR STA	R HGR STA
.5000+02	.2500+02	.9000+02	.4000+02	.7000+02

MOMENT ARMS, INCHES

XF	XA	XBF	XBA
.1000+02	.2000+02	.2500+02	.4000+02

REFERENCE LENGTH , INCHES
CBAR = .1000+02

AERODYNAMIC DATA

RHO = .23780-02 SLUGS/CU FT
V = .80000+03 FT/SEC TAS
NORMAL FORCE COEF = .17635+01
DRAG COFF = .50000-00
LATERAL FORCE COEF -.12063+01
PITCH MOMENT COEF = -.88176-00
YAW MOMENT COEF = .60316-00

LOAD FACTORS
GX = -.20000+01
GY = .15000+01
GZ = .80000+01

ANGULAR ACCELERATIONS, RADIANS PER SQUARE SECOND
THETA DOUBLE DOT = -.12000+02
PSI DOUBLE DOT = .60000+01

DYNAMIC PRESSURE = .52844+01 LBS/SQ.IN.

TABLE C-2. (Continued)

```
HANGER LOADS

RZF   =     .88249+03 LBS
RZA   =     .51448+03 LBS
RYF   =     .23254+02 LBS
RYA   =     .11627+02 LBS
RXA   =     .00000    LBS
RXF   =    -.19248+03 LBS
RFSBZ =    -.44461+03 LBS
RRSBZ =    -.34078+03 LBS
RFSBY =    -.25670+03 LBS
RRSBY =    -.19675+03 LBS
HM =     .12896+04 LB'IN AT NO.   2 SEGMENT

SWAY BRACE LOADS
RBFMX =     .51339+03 LBS
RBFMN =     .00000    LBS
RBAMX =     .39350+03 LBS
RBAMN =     .00000    LBS
RBFMX IS AT RIGHT FRONT BRACE
RBAMX IS AT RIGHT REAR BRACE

    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
    0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL =    -.40830500+01
DELARL =    -.40830500+01
ADJUSTED SUMMED AERO FORCE COEFF =      .17632132+01
ADJUSTED SUMMED AERO MOMENT COEFF =    -.88167507-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  1
   .40831+01   .41110+01   .43068+01   .47922+01   .53569+01   .57992+01
   .66342+01   .72700+01   .80561+01   .89459+01   .98607+01   .10680+02
   .11614+02   .12542+02   .13227+02   .14196+02   .14897+02   .15194+02
   .15671+02   .16067+02   .16631+02   .17073+02   .16596+02   .16665+02
   .16271+02   .15956+02   .15807+02   .15405+02   .14702+02   .13966+02
   .13581+02   .13028+02   .12058+02   .11038+02   .10285+02   .91144+01
   .79655+01   .66980+01   .54321+01   .45891+01   .41303+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  2
   .41303+01   .40997+01   .40690+01   .40384+01   .40078+01   .39772+01
   .39466+01   .39159+01   .38853+01   .33547+01   .38241+01   .37934+01
   .37628+01   .37322+01   .37016+01   .36709+01   .36403+01   .36097+01
   .35791+01   .35485+01   .35178+01   .34872+01   .34566+01   .34260+01
   .33953+01   .33647+01   .33341+01   .33035+01   .32728+01   .32422+01
   .32116+01   .31810+01   .31504+01   .31197+01   .30891+01   .30585+01
   .30279+01   .29972+01   .29666+01   .29360+01   .29054+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
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TABLE C-2. (Continued)

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DISTRIBUTED AERO LOADS FOR SEG  3
   .29054+01    .28645+01    .28237+01    .27829+01    .27421+01    .27012+01
   .26604+01    .26196+01    .25787+01    .25379+01    .24971+01    .24562+01
   .24154+01    .23746+01    .23337+01    .22929+01    .22521+01    .22113+01
   .21704+01    .21296+01    .20888+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  4
   .20888+01    .20479+01    .20071+01    .19663+01    .19254+01    .18846+01
   .18438+01    .18029+01    .17621+01    .17213+01    .16805+01    .16396+01
   .15988+01    .15580+01    .15171+01    .14763+01    .14355+01    .13946+01
   .13538+01    .13130+01    .12722+01    .12313+01    .11905+01    .11497+01
   .11088+01    .10680+01    .10272+01    .98634-00    .94551-00    .90468-00
   .86385-00    .82302-00    .78219-00    .74136-00    .70053-00    .65970-00
   .61886-00    .57803-00    .53720-00    .49637-00    .45554-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  5
   .45554-00    .41471-00    .37388-00    .33305-00    .29222-00    .25139-00
   .21056-00    .16973-00    .12890-00    .88068-01    .47238-01    .64071-02
  -.34423-01   -.75254-01   -.11608+00   -.15691-00   -.19775-00   -.23858-00
  -.27941-00   -.32024-00   -.36107-00   -.40190-00   -.44273-00   -.48356-00
  -.52439-00   -.56522-00   -.60605-00   -.64688-00   -.68771-00   -.72854-00
  -.76937-00   -.81020-00   -.85103-00   -.89186-00   -.93269-00   -.97352-00
  -.10144+01   -.10552+01   -.10960+01   -.11368+01   -.11777+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
  -.32664+01   -.33073+01   -.33481+01   -.33889+01   -.34298+01   -.34706+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
  -.34706+01   -.35114+01   -.35523+01   -.35931+01   -.36339+01   -.36747+01
  -.37156+01   -.37564+01   -.37972+01   -.38381+01   -.38789+01   -.39197+01
  -.39606+01   -.40014+01   -.40422+01   -.40831+01
CONCENTRATED AERO FORCES AND MOMENTS
   .00000       .00000
   .00000       .00000
   .00000       .00000
   .00000       .00000
   .00000       .00000
   .39372+03    .00000
   .00000       .00000
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
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    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
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    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 MOMENT POINTS FELL OFF YOUR PLOT
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TABLE C-2. (Continued)

CASE 2
PLANE 1
SEGMENT 1

STATION	LOAD	SHEAR	MOMENT
0.00000000	2.73174850+00	0.00000000	9.80825600-03
6.25000000-01	2.37667290+00	1.59638170+00	5.24017100-01
1.25000000+00	2.18874720+00	3.02307550+00	1.97312919+00
1.87500000+00	2.28941370+00	4.42250080+00	4.30540350+00
2.50000000+00	2.46866640+00	5.90940080+00	7.53965340+00
3.12500000+00	2.52460720+00	7.46979880+00	1.17261849+01
3.75000000+00	2.97238670+00	[illegible].18760930+00	1.69371560+01
4.37500000+00	3.22011180+00	1.11227650+01	2.32896790+01
5.00000000+00	3.61731710+00	1.32594615+01	3.09146560+01
5.62500000+00	4.11733890+00	1.56765414+01	3.99626880+01
6.25000000+00	4.64151460+00	1.84136830+01	5.06214150+01
6.87500000+00	5.06959440+00	2.14484040+01	6.30838480+01
7.50000000+00	5.61135220+00	2.47862000+01	7.75376930+01
8.12500000+00	6.14549460+00	2.84602140+01	9.41827280+01
8.75000000+00	6.43768150+00	3.23924560+01	1.13204717+02
9.37500000+00	7.01096180+00	3.65951580+01	1.34768870+02
1.00000000+01	7.31603150+00	4.10723430+01	1.59045500+02
1.06250000+01	7.21670340+00	4.56138220+01	1.86140460+02
1.12500000+01	7.29637150+00	5.01491580+01	2.16071920+02
1.18750000+01	7.29435350+00	5.47087590+01	2.48845550+02
1.25000000+01	7.45900530+00	5.93191830+01	2.94[illegible]84820+02
1.31250000+01	7.50082490+00	6.39941300+01	3.23025760+02
1.37500000+01	6.62274000+00	6.84[illegible]77440+01	3.64406870+02
1.43750000+01	6.29085900+00	7.24432440+01	4.08428330+02
1.50000000+01	5.49462750+00	7.61262080+01	4.54861810+02
1.56250000+01	4.77608450+00	7.93[illegible]8040+01	5.03449220+02
1.62499990+01	4.22295810+00	8.21480050+01	5.53918440+02
1.68750000+01	3.41562490+00	8.45350620+01	6.06012430+02
1.75000000+01	2.30686140+00	8.63233380+01	6.59411210+02
1.81250000+01	1.16382944+00	8.74079280+01	7.13707750+02
1.87500000+01	3.70860100-01	8.78875190+01	7.68493110+02
1.93749990+01	-5.89420910-01	8.78192190+01	8.23406990+02
2.00000000+01	-1.96894061+00	8.70197310+01	8.78049690+02
2.06250000+01	-3.39943950+00	8.53421130+01	9.31918290+02
2.12500000+01	-4.56342560+00	8.28537180+01	9.84485030+02
2.18750000+01	-6.14537250+00	7.95072200+01	1.03522330+03
2.24999990+01	-7.70708520+00	7.51783270+01	1.08357310+03
2.31250000+01	-9.38828850+00	6.98360230+01	1.12889560+03
2.37500000+01	-1.10686695+01	6.34432230+01	1.17055090+03
2.43750000+01	-1.23264904+01	5.61322360+01	1.20792370+03
2.50000000+01	-1.32014706+01	4.81547480+01	1.24039850+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	-1.32014706+01	-3.96457660+02	1.24047070+03
2.53750000+01	-1.32431788+01	-4.01416030+02	1.09094170+03
2.57499990+01	-1.32848870+01	-4.06390050+02	9.39478080+02
2.61250000+01	-1.33265952+01	-4.11379690+02	7.86146250+02
2.64999990+01	-1.33683034+01	-4.16384990+02	6.30940390+02

TABLE C-2. (Continued)

2.68750000+01	-1.34100118+01	-4.21405920+02	4.73854590+02
2.72499990+01	-1.34517200+01	-4.26442490+02	3.14883010+02
2.76250000+01	-1.34934282+01	-4.31494710+02	1.54019790+02
2.79999990+01	-1.35351364+01	-4.36562560+02	-8.74094510+00
2.83750000+01	-1.35768446+01	-4.41646050+02	-1.73405060+02
2.87499990+01	-1.36185529+01	-4.46745190+02	-3.39978420+02
2.91250000+01	-1.36602611+01	-4.51859970+02	-5.08466880+02
2.94999990+01	-1.37019693+01	-4.56990380+02	-6.78876330+02
2.98750000+01	-1.37436774+01	-4.62136440+02	-8.51212610+02
3.02499990+01	-1.37853857+01	-4.67298140+02	-1.02548160+03
3.06250000+01	-1.38270941+01	-4.72475480+02	-1.20168910+03
3.09999990+01	-1.38688020+01	-4.77668460+02	-1.37984110+03
3.13750000+01	-1.39105105+01	-4.82877080+02	-1.55994340+03
3.17500000+01	-1.39522185+01	-4.88101330+02	-1.74230180+03
3.21250000+01	-1.39939267+01	-4.93341230+02	-1.92602230+03
3.25000000+01	-1.40356352+01	-4.98596770+02	-2.11201060+03
3.28750000+01	-1.40773431+01	-5.03867950+02	-2.29997280+03
3.32500000+01	-1.41190513+01	-5.09154730+02	-2.48991450+03
3.36250000+01	-1.41607597+01	-5.14457240+02	-2.68184180+03
3.40000000+01	-1.42024679+01	-5.19775350+02	-2.87576040+03
3.43750000+01	-1.42441761+01	-5.25109080+02	-3.07167620+03
3.47500000+01	-1.42858843+01	-5.30458470+02	-3.26959510+03
3.51250000+01	-1.43275925+01	-5.35823490+02	-3.46952300+03
3.55000000+01	-1.43693009+01	-5.41204150+02	-3.67146570+03
3.58749990+01	-1.44110091+01	-5.46600450+02	-3.87542900+03
3.62500000+01	-1.44527173+01	-5.52012390+02	-4.08141890+03
3.66249990+01	-1.44944255+01	-5.57439970+02	-4.28944120+03
3.70000000+01	-1.45361337+01	-5.62883200+02	-4.49950170+03
3.73749990+01	-1.45778420+01	-5.68342070+02	-4.71160650+03
3.77500000+01	-1.46195502+01	-5.73816580+02	-4.92576120+03
3.81249990+01	-1.46612581+01	-5.79306730+02	-5.14197180+03
3.85000000+01	-1.47029665+01	-5.84812520+02	-5.36024410+03
3.88749990+01	-1.47446748+01	-5.90333950+02	-5.58058400+03
3.92500000+01	-1.47863829+01	-5.95871020+02	-5.80299740+03
3.96249990+01	-1.48280911+01	-6.01423730+02	-6.02749010+03
4.00000000+01	-1.48697996+01	-6.06992090+02	-6.25414040+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	-1.48697996+01	2.75498630+02	-4.96442440+03
4.04999990+01	-1.49254103+01	2.68049840+02	-4.82844100+03
4.10000000+01	-1.49810214+01	2.60573230+02	-4.69628530+03
4.15000000+01	-1.50366322+01	2.53068820+02	-4.56787480+03
4.19999990+01	-1.50922434+01	2.45536600+02	-4.44322350+03
4.25000000+01	-1.51478540+01	2.37976570+02	-4.32234530+03
4.30000000+01	-1.52034652+01	2.30388750+02	-4.20525390+03
4.34999990+01	-1.52590760+01	2.22773110+02	-4.09196350+03
4.40000000+01	-1.53146871+01	2.15129670+02	-3.98248780+03
4.45000000+01	-1.53702981+01	2.07458420+02	-3.87684080+03
4.50000000+01	-1.54259090+01	1.99759370+02	-3.77503640+03
4.55000000+01	-1.54815201+01	1.92032520+02	-3.67708850+03
4.59999990+01	-1.55371311+01	1.84277850+02	-3.58301090+03

TABLE C-2. (Continued)

4.65000000+01	-1.55927419+01	1.76495390+02	-3.49281760+03
4.70000000+01	-1.56483528+01	1.68685120+02	-3.40652250+03
4.74999990+01	-1.57039639+01	1.60847040+02	-3.32413940+03
4.80000000+01	-1.57595749+01	1.52981150+02	-3.24568240+03
4.85000000+01	-1.58151857+01	1.45087470+02	-3.17116530+03
4.89999990+01	-1.58707967+01	1.37165970+02	-3.10060190+03
4.95000000+01	-1.59264078+01	1.29216670+02	-3.03700630+03
5.00000000+01	-1.45102114+01	1.21607518+02	-2.97140440+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000+01	-1.45102114+01	1.21607518+02	-2.97131590+03
5.05000000+01	-1.30922800+01	1.14706896+02	-2.91216460+03
5.10000000+01	-1.31454838+01	1.08147455+02	-2.85645100+03
5.14999990+01	-1.31986877+01	1.01561413+02	-2.80402380+03
5.20000000+01	-1.32518915+01	9.49487690+01	-2.75489620+03
5.25000000+01	-1.33050954+01	8.83095230+01	-2.70908170+03
5.29999990+01	-1.33582992+01	8.16436750+01	-2.66659340+03
5.35000000+01	-1.34115031+01	7.49512250+01	-2.62744470+03
5.40000000+01	-1.34647069+01	6.82321730+01	-2.59164880+03
5.44999990+01	-1.35179109+01	6.14865180+01	-2.55921920+03
5.50000000+01	-1.35711148+01	5.47142620+01	-2.53016900+03
5.55000000+01	-1.36243186+01	4.79154040+01	-2.50451160+03
5.59999990+01	-1.36775225+01	4.10899440+01	-2.48226030+03
5.65000000+01	-1.37307265+01	3.42378820+01	-2.46342840+03
5.70000000+01	-1.37839302+01	2.73592170+01	-2.44802910+03
5.75000000+01	-1.38371340+01	2.04539520+01	-2.43607580+03
5.80000000+01	-1.38903380+01	1.35220842+01	-2.42758180+03
5.84999990+01	-1.39435419+01	6.56361420+00	-2.42256050+03
5.90000000+01	-1.39967456+01	-4.21457650-01	-2.42102490+03
5.95000000+01	-1.40499496+01	-7.43313150+00	-2.42298850+03
5.99999990+01	-1.41031534+01	-1.44714072+01	-2.42846460+03
6.05000000+01	-1.41563573+01	-2.15362850+01	-2.43746650+03
6.10000000+01	-1.42095611+01	-2.86277640+01	-2.45000760+03
6.14999990+01	-1.42627650+01	-3.57458460+01	-2.46610090+03
6.20000000+01	-1.43159690+01	-4.28905290+01	-2.48576000+03
6.25000000+01	-1.43691729+01	-5.00618140+01	-2.50899810+03
6.30000000+01	-1.44223767+01	-5.72597010+01	-2.53582840+03
6.35000000+01	-1.44755806+01	-6.44841910+01	-2.56626430+03
6.40000000+01	-1.45287844+01	-7.17352810+01	-2.60031920+03
6.45000000+01	-1.45319883+01	-7.90129740+01	-2.63800630+03
6.50000000+01	-1.46351921+01	-8.63172690+01	-2.67933880+03
6.54999990+01	-1.46883961+01	-9.36481650+01	-2.72433010+03
6.60000000+01	-1.47415998+01	-1.01005662+02	-2.77299360+03
6.65000000+01	-1.47948037+01	-1.08389763+02	-2.82534240+03
6.69999990+01	-1.48480077+01	-1.15800467+02	-2.88139000+03
6.75000000+01	-1.49012115+01	-1.23237770+02	-2.94114950+03
6.80000000+01	-1.49544152+01	-1.30701680+02	-3.00463440+03
6.84999990+01	-1.50076192+01	-1.38192180+02	-3.07185780+03
6.90000000+01	-1.50608231+01	-1.45709290+02	-3.14283320+03
6.95000000+01	-1.51140269+01	-1.53253000+02	-3.21757380+03
7.00000000+01	-1.51672309+01	-1.60823320+02	-3.29617340+03

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE C-2. (Continued)

CASE 2
PLANE 1
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	-1.51672309+01	3.53652310+02	-3.29609280+03
7.05000000+01	-1.52204348+01	3.46055400+02	-3.12108520+03
7.09999990+01	-1.52736386+01	3.38431880+02	-2.94996340+03
7.15000000+01	-1.53268425+01	3.30781760+02	-2.78266010+03
7.20000000+01	-1.53800463+01	3.23105040+02	-2.61918840+03
7.24999990+01	-1.54332502+01	3.15401720+02	-2.45956170+03
7.30000000+01	-1.54864540+01	3.07671790+02	-2.30379340+03
7.35000000+01	-1.55396579+01	2.99915270+02	-2.15189660+03
7.39999990+01	-1.55928617+01	2.92132140+02	-2.00388470+03
7.45000000+01	-1.56460657+01	2.84322410+02	-1.85977110+03
7.50000000+01	-1.56992694+01	2.76486080+02	-1.71956900+03
7.55000000+01	-1.57524733+01	2.68623140+02	-1.58329170+03
7.60000000+01	-1.58056770+01	2.60733610+02	-1.45095250+03
7.65000000+01	-1.58588810+01	2.52817470+02	-1.32256470+03
7.70000000+01	-1.59120848+01	2.44874730+02	-1.19814160+03
7.75000000+01	-1.59652887+01	2.36905390+02	-1.07769660+03
7.79999990+01	-1.60184920+01	2.28909440+02	-9.61242960+02
7.85000000+01	-1.60716960+01	2.20886890+02	-8.48793880+02
7.90000000+01	-1.61249000+01	2.12837750+02	-7.40362720+02
7.94999990+01	-1.61781040+01	2.04762000+02	-6.35962780+02
8.00000000+01	-1.62313070+01	1.96659650+02	-5.35607380+02
8.05000000+01	-1.62845110+01	1.88530690+02	-4.39309780+02
8.09999990+01	-1.63377160+01	1.80375140+02	-3.47083330+02
8.15000000+01	-1.63909200+01	1.72192980+02	-2.58941300+02
8.20000000+01	-1.64441230+01	1.63984220+02	-1.74897000+02
8.25000000+01	-1.64973270+01	1.55748860+02	-9.49637310+01
8.30000000+01	-1.65505300+01	1.47486900+02	-1.91547920+01
8.34999990+01	-1.66037340+01	1.39198330+02	5.25165150+01
8.40000000+01	-1.66569390+01	1.30883160+02	1.20036888+02
8.45000000+01	-1.67101430+01	1.22541393+02	1.83393020+02
8.49999990+01	-1.67633470+01	1.14173020+02	2.42571620+02
8.55000000+01	-1.68165500+01	1.05778047+02	2.97559390+02
8.60000000+01	-1.68697540+01	9.73564710+01	3.48343010+02
8.64999990+01	-1.69229570+01	8.89082950+01	3.94909200+02
8.70000000+01	-1.69761620+01	8.04335140+01	4.37244650+02
8.75000000+01	-1.70293660+01	7.19321330+01	4.75336070+02
8.80000000+01	-1.70825700+01	6.34041490+01	5.09170140+02
8.85000000+01	-1.71357740+01	5.48495640+01	5.38733560+02
8.90000000+01	-1.71889770+01	4.62683750+01	5.64013030+02
8.95000000+01	-1.72421810+01	3.76605860+01	5.84995280+02
9.00000000+01	-1.72953850+01	2.90261950+01	6.01586310+02

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 1
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	-1.93841470+01	-3.11756250+02	6.01666960+02
9.04999990+01	-1.67821910+01	-3.20797830+02	4.43582560+02
9.10000000+01	-1.41761615+01	-3.28537420+02	2.81222190+02
9.15000000+01	-1.15667751+01	-3.34973160+02	1.15317994+02
9.19999990+01	-8.95288580+00	-3.40103070+02	-5.34776110+01
9.25000000+01	-6.33492330+00	-3.43925010+02	-2.24525460+02

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE C-2. (Continued)

CASE 2
PLANE 1
SEGMENT 7

STATION	LOAD	SHEAR	MOMENT
9.25000000+01	-6.33492330+00	4.97971150+01	-2.24511180+02
9.30000000+01	-6.37794430+00	4.66188980+01	-2.00392900+02
9.34999990+01	-6.42096530+00	4.34191710+01	-1.77883380+02
9.40000000+01	-6.46398630+00	4.01979330+01	-1.56979110+02
9.45000000+01	-6.50700730+00	3.69551850+01	-1.37690830+02
9.50000000+01	-6.55002830+00	3.36909260+01	-1.20029301+02
9.55000000+01	-6.59304930+00	3.04051580+01	-1.04005280+02
9.60000000+01	-6.63607030+00	2.70978780+01	-8.96295230+01
9.65000000+01	-6.67909130+00	2.37690870+01	-7.69127820+01
9.70000000+01	-6.72211240+00	2.04187870+01	-6.58658130+01
9.74999990+01	-6.76513330+00	1.70469750+01	-5.64993720+01
9.80000000+01	-6.80815440+00	1.36536541+01	-4.88242150+01
9.85000000+01	-6.85117540+00	1.02388216+01	-4.28510960+01
9.89999990+01	-6.89419630+00	6.80247890+00	-3.85907720+01
9.95000000+01	-6.93721730+00	3.34462550+00	-3.60539950+01
1.00000000+02	-6.98023840+00	-1.34738390-01	-3.52658040+01

0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
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0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
0 DELTA C.P.S FELL OFF YOUR PLOT
AERO ADJUSTMENT
AERO ADJUSTMENT
AERO ADJUSTMENT COMPLETE
MOMENT ADJUSTMENT
DELAFL = .27929792+01
DELARL = .27929792+01
ADJUSTED SUMMED AERO FORCE COEFF = -.12061121+01
ADJUSTED SUMMED AERO MOMENT COEFF = .60310277-00
0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 1

-.27930+01	-.28121+01	-.29460+01	-.32781+01	-.36644+01	-.39669+01
-.45381+01	-.49730+01	-.55107+01	-.61194+01	-.67451+01	-.73057+01
-.79446+01	-.85791+01	-.90482+01	-.97105+01	-.10190+02	-.10393+02
-.10719+02	-.10991+02	-.11376+02	-.11679+02	-.11352+02	-.11400+02
-.11130+02	-.10915+02	-.10813+02	-.10537+02	-.10057+02	-.95532+01
-.92897+01	-.89119+01	-.82483+01	-.75504+01	-.70354+01	-.62347+01
-.54488+01	-.45817+01	-.37158+01	-.31391+01	-.28253+01	

0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG 2

-.28253+01	-.28043+01	-.27834+01	-.27624+01	-.27415+01	-.27206+01
-.26996+01	-.26787+01	-.26577+01	-.26368+01	-.26158+01	-.25949+01
-.25739+01	-.25530+01	-.25320+01	-.25111+01	-.24901+01	-.24692+01
-.24482+01	-.24273+01	-.24063+01	-.23854+01	-.23644+01	-.23435+01
-.23226+01	-.23016+01	-.22807+01	-.22597+01	-.22388+01	-.22178+01
-.21969+01	-.21759+01	-.21550+01	-.21340+01	-.21131+01	-.20921+01
-.20712+01	-.20502+01	-.20293+01	-.20083+01	-.19874+01	

0 AERO LOAD POINTS FELL OFF YOUR PLOT

TABLE C-2. (Continued)

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DISTRIBUTED AERO LOADS FOR SEG  3
  -.19874+01  -.19595+01  -.19315+01  -.19036+01  -.18757+01  -.18477+01
  -.18198+01  -.17919+01  -.17640+01  -.17360+01  -.17081+01  -.16802+01
  -.16522+01  -.16243+01  -.15964+01  -.15685+01  -.15405+01  -.15126+01
  -.14847+01  -.14567+01  -.14288+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  4
  -.14288+01  -.14009+01  -.13729+01  -.13450+01  -.13171+01  -.12892+01
  -.12612+01  -.12333+01  -.12054+01  -.11774+01  -.11495+01  -.11216+01
  -.10936+01  -.10657+01  -.10378+01  -.10099+01  -.98193-00  -.95400-00
  -.92607-00  -.89814-00  -.87021-00  -.84228-00  -.81435-00  -.78642-00
  -.75849-00  -.73056-00  -.70263-00  -.67470-00  -.64677-00  -.61884-00
  -.59091-00  -.56298-00  -.53505-00  -.50712-00  -.47919-00  -.45126-00
  -.42333-00  -.39540-00  -.36747-00  -.33954-00  -.31161-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  5
  -.31161-00  -.28368-00  -.25575-00  -.22782-00  -.19989-00  -.17196-00
  -.14403-00  -.11610+00  -.88172-01  -.60242-01  -.32312-01  -.43826-02
   .23547-01   .51477-01   .79407-01   .10734+00   .13527-00   .16320-00
   .19113-00   .21906-00   .24699-00   .27492-00   .30285-00   .33077-00
   .35870-00   .38663-00   .41456-00   .44249-00   .47042-00   .49835-00
   .52628-00   .55421-00   .58214-00   .61007-00   .63300-00   .66593-00
   .69386-00   .72179-00   .74972-00   .77765-00   .80558-00
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  6
   .22344+01   .22623+01   .22902+01   .23182+01   .23461+01   .23740+01
    0 AERO LOAD POINTS FELL OFF YOUR PLOT
DISTRIBUTED AERO LOADS FOR SEG  7
   .23740+01   .24020+01   .24299+01   .24578+01   .24858+01   .25137+01
   .25416+01   .25695+01   .25975+01   .26254+01   .26533+01   .26813+01
   .27092+01   .27371+01   .27650+01   .27930+01
CONCENTRATED AERO FORCES AND MOMENTS
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
   .00000      .00000
  -.26932+03   .00000
   .00000      .00000
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 LOAD POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 SHEAR POINTS FELL OFF YOUR PLOT
    0 MOMENT POINTS FELL OFF YOUR PLOT
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TABLE C-2. (Continued)

CASE 2
PLANE 2
SEGMENT 1

STATION	LOAD	SHEAR	MOMENT
0.00000000	-2.14715820+00	0.00000000	-2.94248000-02
6.25000000-01	-1.97834795+00	-1.28922067+00	-4.78325010-01
1.25000000+00	-1.92189744+00	-2.50804730+00	-1.68156652+00
1.87500000+00	-2.06090340+00	-3.75267260+00	-3.65463670+00
2.50000000+00	-2.25168830+00	-5.10035750+00	-6.43780060+00
3.12500000+00	-2.35616950+00	-6.54031310+00	-1.00921052+01
3.75000000+00	-2.72671970+00	-8.12871590+00	-1.46927721+01
4.37500000+00	-2.95844710+00	-9.90533050+00	-2.03450030+01
5.00000000+00	-3.29047180+00	-1.18581175+01	-2.71626760+01
5.62500000+00	-3.69085070+00	-1.40397807+01	-3.52723640+01
6.25000000+00	-4.10579810+00	-1.64762330+01	-4.48252130+01
6.87500000+00	-4.45304620+00	-1.91508720+01	-5.59752760+01
7.50000000+00	-4.87607900+00	-2.20662240+01	-6.88722130+01
8.12500000+00	-5.29197990+00	-2.52437410+01	-8.36731720+01
8.75000000+00	-5.54029150+00	-2.86288260+01	-1.00534941+02
9.37500000+00	-5.97902320+00	-3.22286120+01	-1.19559486+02
1.00000000+01	-6.23232170+00	-3.60446570+01	-1.40911470+02
1.06250000+01	-6.20702890+00	-3.99319540+01	-1.64670740+02
1.12500000+01	-6.30211280+00	-4.38410610+01	-1.90866430+02
1.18750000+01	-6.33945370+00	-4.77915500+01	-2.19518200+02
1.25000000+01	-6.48883820+00	-5.18003910+01	-2.50657290+02
1.31250000+01	-6.55223390+00	-5.58757260+01	-2.84322660+02
1.37500000+01	-5.98441040+00	-5.97934280+01	-3.20485850+02
1.43750000+01	-5.78815680+00	-6.34723540+01	-3.59023020+02
1.50000000+01	-5.27239390+00	-6.69287760+01	-3.99789960+02
1.56250000+01	-4.80780720+00	-7.00788390+01	-4.42621420+02
1.62499990+01	-4.45440660+00	-7.29732800+01	-4.87341810+02
1.68750000+01	-3.92506760+00	-7.55918660+01	-5.33785000+02
1.75000000+01	-3.18765710+00	-7.78145920+01	-5.81741120+02
1.81250000+01	-2.42483970+00	-7.95684960+01	-6.30939920+02
1.87500000+01	-1.89951431+00	-8.09198570+01	-6.81109110+02
1.93749990+01	-1.25769662+00	-8.19064840+01	-7.32008950+02
2.00000000+01	-3.27215190-01	-8.24017680+01	-7.83371870+02
2.06250000+01	6.40104060-01	-8.23039910+01	-8.34858980+02
2.12500000+01	1.42708337+00	-8.16579960+01	-8.86113720+02
2.18750000+01	2.50200260+00	-8.04301570+01	-9.36782840+02
2.24999990+01	3.56497390+00	-7.85342280+01	-9.86475830+02
2.31250000+01	4.71164600+00	-7.59477840+01	-1.03476800+03
2.37500000+01	5.95972550+00	-7.26442310+01	-1.08121950+03
2.43750000+01	6.72078510+00	-6.87128220+01	-1.12541030+03
2.50000000+01	7.32186470+00	-6.43244940+01	-1.16663970+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 2
SEGMENT 2

STATION	LOAD	SHEAR	MOMENT
2.50000000+01	7.32186470+00	-3.21021710+02	-1.16685640+03
2.53750000+01	7.37606810+00	-3.18265860+02	-1.28693970+03
2.57499990+01	7.43027150+00	-3.15489660+02	-1.40576880+03
2.61250000+01	7.48447490+00	-3.12693160+02	-1.52355310+03

TABLE C-2. (Continued)

2.64999990+01	7.53867840+00	-3.09876320+02	-1.64028480+03
2.68750000+01	7.59288190+00	-3.07039150+02	-1.75595650+03
2.72499990+01	7.64708530+00	-3.04181660+02	-1.87056030+03
2.76250000+01	7.70128870+00	-3.01303840+02	-1.98408890+03
2.79999990+01	7.75549210+00	-2.98405690+02	-2.09653440+03
2.83750000+01	7.80969550+00	-2.95487230+02	-2.20788930+03
2.87499990+01	7.86389890+00	-2.92548430+02	-2.31814600+03
2.91250000+01	7.91810230+00	-2.89589300+02	-2.42729690+03
2.94999990+01	7.97230580+00	-2.86609850+02	-2.53533420+03
2.98750000+01	8.02650920+00	-2.83610080+02	-2.64225040+03
3.02499990+01	8.08071260+00	-2.80589980+02	-2.74803790+03
3.06250000+01	8.13491600+00	-2.77549550+02	-2.85268900+03
3.09999990+01	8.18911930+00	-2.74488790+02	-2.95619620+03
3.13750000+01	8.24332270+00	-2.71407710+02	-3.05855180+03
3.17500000+01	8.29752620+00	-2.68306310+02	-3.15974820+03
3.21250000+01	8.35172950+00	-2.65184570+02	-3.25977770+03
3.25000000+01	8.40593300+00	-2.62042510+02	-3.35863280+03
3.28750000+01	8.46013640+00	-2.58880120+02	-3.45630570+03
3.32500000+01	8.51433990+00	-2.55697410+02	-3.55278900+03
3.36250000+01	8.56854330+00	-2.52494370+02	-3.64807490+03
3.40000000+01	8.62274670+00	-2.49271010+02	-3.74215600+03
3.43750000+01	8.67695010+00	-2.46027310+02	-3.83502440+03
3.47500000+01	8.73115350+00	-2.42763300+02	-3.92667260+03
3.51250000+01	8.785[illegible]5700+00	-2.39478950+02	-4.01709300+03
3.55000000+01	8.83956040+00	-2.36174280+02	-4.10627790+03
3.58749990+01	8.89376380+00	-2.32849290+02	-4.19421980+03
3.62500000+01	8.94796720+00	-2.29503960+02	-4.28091100+03
3.66249990+01	9.00217060+00	-2.26138310+02	-4.36634400+03
3.70000000+01	9.05637400+00	-2.22752330+02	-4.45051100+03
3.73749990+01	9.11057750+00	-2.19346030+02	-4.53340440+03
3.77500000+01	9.16478090+00	-2.15919410+02	-4.61501670+03
3.81249990+01	9.21898420+00	-2.12472450+02	-4.69534010+03
3.85000000+01	9.27318770+00	-2.09005170+02	-4.77436710+03
3.88749990+01	9.32739100+00	-2.05517560+02	-4.85209000+03
3.92500000+01	9.38159440+00	-2.02009630+02	-4.92850140+03
3.96249990+01	9.43579790+00	-1.98481370+02	-5.00359340+03
4.00000000+01	9.49000140+00	-1.94932780+02	-5.07714170+03

0 MOMENT POINTS FELL OFF YOUR PLOT

CASE 2
PLANE 2
SEGMENT 3

STATION	LOAD	SHEAR	MOMENT
4.00000000+01	9.49000140+00	-1.71679030+02	-5.07743080+03
4.04999990+01	9.56227260+00	-1.66915960+02	-5.16236860+03
4.10000000+01	9.63454380+00	-1.62116760+02	-5.24462680+03
4.15000000+01	9.70681500+00	-1.57281410+02	-5.32447620+03
4.19999990+01	9.77908630+00	-1.52409940+02	-5.40189900+03
4.25000000+01	9.85135750+00	-1.47502330+02	-5.47687700+03
4.30000000+01	9.92362870+00	-1.42558590+02	-5.54939230+03
4.34999990+01	9.99589980+00	-1.37578700+02	-5.61942650+03
4.40000000+01	1.00681710+01	-1.32562690+02	-5.68696190+03
4.45000000+01	1.01404422+01	-1.27510538+02	-5.75198020+03
4.50000000+01	1.02127134+01	-1.22422251+02	-5.81446330+03
4.55000000+01	1.02849847+01	-1.17297826+02	-5.87439330+03

TABLE C-2. (Continued)

4.59999990+01	1.03572559+01	-1.12137266+02	-5.93175200+03
4.65000000+01	1.04295271+01	-1.06940571+02	-5.98652150+03
4.70000000+01	1.05017983+01	-1.01707741+02	-6.03868350+03
4.74999990+01	1.05740696+01	-9.64387740+01	-6.08822010+03
4.80000000+01	1.06463408+01	-9.11336730+01	-6.13511320+03
4.85000000+01	1.07186120+01	-8.57924340+01	-6.17934470+03
4.89999990+01	1.07908833+01	-8.04150600+01	-6.22089650+03
4.95000000+01	1.08631545+01	-7.50015510+01	-6.25975060+03
5.00000000+01	9.92839900+00	-6.98036630+01	-6.29563940+03

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CASE 2
PLANE 2
SEGMENT 4

STATION	LOAD	SHEAR	MOMENT
5.00000000+01	9.92839900+00	-6.98036630+01	-6.29590490+03
5.05000000+01	8.98688190+00	-6.50748430+01	-6.32984290+03
5.10000000+01	9.05193170+00	-6.05651400+01	-6.36125280+03
5.14999990+01	9.11698160+00	-5.60229120+01	-6.39039980+03
5.20000000+01	9.18203170+00	-5.14481590+01	-6.41726750+03
5.25000000+01	9.24708150+00	-4.68408810+01	-6.44183980+03
5.29999990+01	9.31213140+00	-4.22010780+01	-6.46410020+03
5.35000000+01	9.37718150+00	-3.75287500+01	-6.40403260+03
5.40000000+01	9.44223130+00	-3.28238970+01	-6.50162080+03
5.44999990+01	9.50728130+00	-2.80865190+01	-6.51684840+03
5.50000000+01	9.57233130+00	-2.33166160+01	-6.52969910+03
5.55000000+01	9.63738120+00	-1.85141880+01	-6.54015680+03
5.59999990+01	9.70243110+00	-1.36792352+01	-6.54820510+03
5.65000000+01	9.76748110+00	-8.81175720+00	-6.55382780+03
5.70000000+01	9.832[illegible]3100+00	-3.91175430+00	-6.55700870+03
5.75000000+01	9.89758090+00	1.02077370+00	-6.55773140+03
5.80000000+01	9.96263090+00	5.98582660+00	-6.55597980+03
5.84999990+01	1.00276806+01	1.09834045+01	-6.55173760+03
5.90000000+01	1.00927306+01	1.60135070+01	-6.54498830+03
5.95000000+01	1.01577806+01	2.10761350+01	-6.53571590+03
5.99999990+01	1.02228304+01	2.61712870+01	-6.52390410+03
6.05000000+01	1.02878804+01	3.12989650+01	-6.50953650+03
6.10000000+01	1.03529304+01	3.64591670+01	-6.49259700+03
6.14999990+01	1.04179804+01	4.16518950+01	-6.47306930+03
6.20000000+01	1.04830302+01	4.68771480+01	-6.45093710+03
6.25000000+01	1.05480803+01	5.21349250+01	-6.42618410+03
6.30000000+01	1.06131301+01	5.74252270+01	-6.39879410+03
6.35000000+01	1.06781801+01	6.27480540+01	-6.36875090+03
6.40000000+01	1.07432299+01	6.81034070+01	-6.33603800+03
6.45000000+01	1.08082799+01	7.34912840+01	-6.30063940+03
6.50000000+01	1.08733299+01	7.89116860+01	-6.26253870+03
6.54999990+01	1.09383797+01	8.43646120+01	-6.22171960+03
6.60000000+01	1.10034297+01	8.98500640+01	-6.17816600+03
6.65000000+01	1.10684797+01	9.53680410+01	-6.13186150+03
6.69999990+01	1.11335295+01	1.00918541+02	-6.08278990+03
6.75000000+01	1.11985795+01	1.06501568+02	-6.03093490+03
6.80000000+01	1.12636294+01	1.12117120+02	-5.97628030+03
6.84999990+01	1.13286794+01	1.17765198+02	-5.91880970+03
6.90000000+01	1.13937294+01	1.23445799+02	-5.85850700+03
6.95000000+01	1.14587792+01	1.29158920+02	-5.79535590+03
7.00000000+01	1.15238292+01	1.34904580+02	-5.72909800+03

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE C-2. (Continued)

CASE 2
PLANE 2
SEGMENT 5

STATION	LOAD	SHEAR	MOMENT
7.00000000+01	1.15238292+01	1.46531450+02	-5.72934000+03
7.05000000+01	1.15888792+01	1.52309630+02	-5.65487170+03
7.09999990+01	1.16539290+01	1.58120330+02	-5.57726420+03
7.15000000+01	1.17189790+01	1.63963560+02	-5.49674320+03
7.20000000+01	1.17840290+01	1.69839310+02	-5.41329260+03
7.24999990+01	1.18490788+01	1.75747580+02	-5.32689590+03
7.30000000+01	1.19141288+01	1.81686380+02	-5.23753700+03
7.35000000+01	1.19791786+01	1.87661710+02	-5.14519950+03
7.39999990+01	1.20442286+01	1.93667560+02	-5.04986730+03
7.45000000+01	1.21092787+01	1.99705940+02	-4.95152390+03
7.50000000+01	1.21743287+01	2.05776830+02	-4.85015330+03
7.55000000+01	1.22393785+01	2.11880260+02	-4.74573900+03
7.60000000+01	1.23044283+01	2.18016210+02	-4.63826490+03
7.65000000+01	1.23694781+01	2.24184680+02	-4.52771480+03
7.70000000+01	1.24345281+01	2.30385690+02	-4.41407220+03
7.75000000+01	1.24995781+01	2.36619210+02	-4.29732100+03
7.79999990+01	1.25646279+01	2.42885260+02	-4.17744490+03
7.85000000+01	1.26296779+01	2.49183840+02	-4.05442760+03
7.90000000+01	1.26947279+01	2.55514940+02	-3.92825290+03
7.94999990+01	1.27597779+01	2.61878560+02	-3.79890460+03
8.00000000+01	1.28248277+01	2.68274710+02	-3.66636630+03
8.05000000+01	1.28898778+01	2.74703380+02	-3.53062180+03
8.09999990+01	1.29549276+01	2.81164590+02	-3.39165480+03
8.15000000+01	1.30199776+01	2.87658310+02	-3.24944910+03
8.20000000+01	1.30850276+01	2.94184560+02	-3.10398840+03
8.25000000+01	1.31500774+01	3.00743330+02	-2.95525640+03
8.30000000+01	1.32151274+01	3.07334630+02	-2.80323690+03
8.34999990+01	1.32801774+01	3.13958460+02	-2.64791370+03
8.40000000+01	1.33452272+01	3.20614810+02	-2.48927030+03
8.45000000+01	1.34102772+01	3.27303690+02	-2.32729080+03
8.49999990+01	1.34753271+01	3.34025080+02	-2.16195860+03
8.55000000+01	1.35403770+01	3.40779010+02	-1.99325760+03
8.60000000+01	1.36054269+01	3.47565460+02	-1.82117140+03
8.64999990+01	1.36704769+01	3.54384430+02	-1.64568400+03
8.70000000+01	1.37355268+01	3.61235920+02	-1.46677890+03
8.75000000+01	1.38005767+01	3.68119950+02	-1.28443990+03
8.80000000+01	1.38656267+01	3.75036500+02	-1.09865080+03
8.85000000+01	1.39306767+01	3.81985570+02	-9.09395370+02
8.90000000+01	1.39957265+01	3.88967170+02	-7.16657190+02
8.95000000+01	1.40607765+01	3.95981300+02	-5.20420080+02
9.00000000+01	1.41258265+01	4.03027940+02	-3.20425800+02

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CASE 2
PLANE 2
SEGMENT 6

STATION	LOAD	SHEAR	MOMENT
9.00000000+01	1.55546283+01	2.06277010+02	-3.20667770+02
9.04999990+01	1.34209325+01	2.13520900+02	-2.15880620+02
9.10000000+01	1.12750162+01	2.19694890+02	-1.07497011+02
9.15000000+01	9.11747570+00	2.24793010+02	3.70461760+00
9.19999990+01	6.94735890+00	2.28809220+02	1.17184828+02
9.25000000+01	4.76502280+00	2.31737310+02	2.32443950+02

0 MOMENT POINTS FELL OFF YOUR PLOT

TABLE C-2. (Continued)

CASE 2
PLANE 2
SEGMENT 7

STATION	LOAD	SHEAR	MOMENT
9.25000000+01	4.76502280+00	-3.75852850+01	2.32401120+02
9.30000000+01	4.79952410+00	-3.51941480+01	2.14163420+02
9.34999990+01	4.83402540+00	-3.27857610+01	1.97168440+02
9.40000000+01	4.86852670+00	-3.03601240+01	1.81381970+02
9.45000000+01	4.90302810+00	-2.79172350+01	1.66812640+02
9.50000000+01	4.93752930+00	-2.54570950+01	1.53469050+02
9.55000000+01	4.97203060+00	-2.29797060+01	1.41[illegible]39850+02
9.60000000+01	5.00653190+00	-2.04850650+01	1.[illegible]0493660+02
9.65000000+01	5.04103330+00	-1.79731740+01	1.[illegible]79101+02
9.70000000+01	5.07553460+00	-1.54440324+01	1.12524800+02
9.74999990+01	5.11003590+00	-1.28976398+01	1.05439382+02
9.80000000+01	5.14453720+00	-1.03339965+01	9.96314740+01
9.85000000+01	5.17903850+00	-7.75310280+00	9.51097000+01
9.89999990+01	5.21353980+00	-5.15495810+00	9.18826860+01
9.95000000+01	5.24804120+00	-2.53956290+00	8.99590560+01
1.00000000+02	5.28254250+00	9.30829640-02	8.93902760+01

RESULTANT LOADS, CASE 2
SEGMENT 1

STATION	SHEAR	MOMENT
0.00000000	0.00000000	3.10164590-02
6.25000000-01	2.05195620+00	7.09498930-01
1.25000000+00	3.92801310+00	2.59247070+00
1.87500000+00	5.80009180+00	5.64737720+00
2.50000000+00	7.80606580+00	9.91421450+00
3.12500000+00	9.92842320+00	1.54710696+01
3.75000000+00	1.22673626+01	2.24219720+01
4.37500000+00	1.48940078+01	3.09245580+01
5.00000000+00	1.77884300+01	4.11524830+01
5.62500000+00	2.10444620+01	5.33024960+01
6.25000000+00	2.47089040+01	6.76152880+01
6.87500000+00	2.87539550+01	8.43374370+01
7.50000000+00	3.31854470+01	1.03708606+02
8.12500000+00	3.80424800+01	1.25982482+02
8.75000000+00	4.32305560+01	1.51395410+02
9.37500000+00	4.87636030+01	1.80158600+02
1.00000000+01	5.46457190+01	2.12488860+02
1.06250000+01	6.06232770+01	2.48525090+02
1.12500000+01	6.66106340+01	2.88300310+02
1.18750000+01	7.26435160+01	3.31831810+02
1.25000000+01	7.87530700+01	3.79157870+02
1.31250000+01	8.49549610+01	4.30331280+02
1.37500000+01	9.08563330+01	4.85287070+02
1.43750000+01	9.63159550+01	5.43793370+02
1.50000000+01	1.01364000+02	6.05583410+02
1.56250000+01	1.05854679+02	6.70354250+02
1.62499990+01	1.09878997+02	7.37785660+02
1.68750000+01	1.13403292+02	8.07575060+02
1.75000000+01	1.16218884+02	8.79344010+02
1.81250000+01	1.18200217+02	9.52609020+02
1.87500000+01	1.19466476+02	1.02688420+03
1.93749990+01	1.20086997+02	1.10174230+03

TABLE C-2. (Continued)

2.00000000+01	1.19843585+02	1.17670840+03
2.06250000+01	1.18563160+02	1.25118390+03
2.12500000+01	1.16330420+02	1.32454070+03
2.18750000+01	1.13094687+02	1.39615890+03
2.24999990+01	1.08717089+02	1.46535490+03
2.31250000+01	1.03175267+02	1.53138820+03
2.37500000+01	9.64480520+01	1.59349460+03
2.43750000+01	8.87258680+01	1.65094760+03
2.50000000+01	8.03524750+01	1.70283190+03

SEGMENT 2

STATION	SHEAR	MOMENT
2.50000000+01	5.10130990+02	1.70303310+03
2.53750000+01	5.12277250+02	1.68711800+03
2.57499990+01	5.14477010+02	1.69080010+03
2.61250000+01	5.16730350+02	1.71442110+03
2.64999990+01	5.19037360+02	1.75744700+03
2.68750000+01	5.21398100+02	1.81876910+03
2.72499990+01	5.23812640+02	1.89687830+03
2.76250000+01	5.26280990+02	1.99005800+03
2.79999990+01	5.28803200+02	2.09655260+03
2.83750000+01	5.31379270+02	2.21468840+03
2.87499990+01	5.34009220+02	2.34294390+03
2.91250000+01	5.36693010+02	2.47998160+03
2.94999990+01	5.39430640+02	2.62465090+03
2.98750000+01	5.42222060+02	2.77597730+03
3.02499990+01	5.45067220+02	2.93314250+03
3.06250000+01	5.47966080+02	3.09546310+03
3.09999990+01	5.50918550+02	3.26236990+03
3.13750000+01	5.53924550+02	3.43338940+03
3.17500000+01	5.56984000+02	3.60812680+03
3.21250000+01	5.60096790+02	3.78625300+03
3.25000000+01	5.63262830+02	3.96749330+03
3.28750000+01	5.66481980+02	4.15161700+03
3.32500000+01	5.69754110+02	4.33843100+03
3.36250000+01	5.73079100+02	4.52777270+03
3.40000000+01	5.76456790+02	4.71950520+03
3.43750000+01	5.79887050+02	4.91351260+03
3.47500000+01	5.83369690+02	5.10969760+03
3.51250000+01	5.86904560+02	5.30797750+03
3.55000000+01	5.90491500+02	5.50828270+03
3.58749990+01	5.94130310+02	5.71055420+03
3.62500000+01	5.97820830+02	5.91474250+03
3.66249990+01	6.01562640+02	6.12080590+03
3.70000000+01	6.05356170+02	6.32870940+03
3.73749990+01	6.09200600+02	6.53842420+03
3.77500000+01	6.13095950+02	6.74992600+03
3.81249990+01	6.17041990+02	6.96319550+03
3.85000000+01	6.21038510+02	7.17821680+03
3.88749990+01	6.25085300+02	7.39497770+03
3.92500000+01	6.29182140+02	7.61346860+03
3.96249990+01	6.33328790+02	7.83358270+03
4.00000000+01	6.37525040+02	8.055[illegible]3470+03

TABLE C-2. (Continued)

SEGMENT 3

STATION	SHEAR	MOMENT
4.00000000+01	3.24612360+02	7.10111350+03
4.04999990+01	3.15771510+02	7.06851410+03
4.10000000+01	3.06888010+02	7.03997190+03
4.15000000+01	2.97961860+02	7.01537790+03
4.19999990+01	2.88993100+02	6.99447970+03
4.25000000+01	2.79981760+02	6.97702300+03
4.30000000+01	2.70927890+02	6.96275190+03
4.34999990+01	2.61831540+02	6.95141140+03
4.40000000+01	2.52692780+02	6.94274770+03
4.45000000+01	2.43511670+02	6.93650990+03
4.50000000+01	2.34288310+02	6.93245140+03
4.55000000+01	2.25022820+02	6.93033010+03
4.59999990+01	2.15715310+02	6.92990970+03
4.65000000+01	2.06365960+02	6.93096040+03
4.70000000+01	1.96974960+02	6.93325990+03
4.74999990+01	1.87542540+02	6.93659330+03
4.80000000+01	1.78069030+02	6.94075410+03
4.85000000+01	1.68554780+02	6.94554460+03
4.89999990+01	1.59000270+02	6.95077580+03
4.95000000+01	1.49406090+02	6.95626850+03
5.00000000+01	1.40217470+02	6.96163190+03

SEGMENT 4

STATION	SHEAR	MOMENT
5.00000000+01	1.40217470+02	6.96183420+03
5.05000000+01	1.31880280+02	6.96761170+03
5.10000000+01	1.23951636+02	6.97315200+03
5.14999990+01	1.15988306+02	6.97852120+03
5.20000000+01	1.07991580+02	6.98360760+03
5.25000000+01	9.99631930+01	6.98830610+03
5.29999990+01	9.19054990+01	6.99251820+03
5.35000000+01	8.38217940+01	6.99615210+03
5.40000000+01	7.57168240+01	6.99912250+03
5.44999990+01	6.75976660+01	7.00135090+03
5.50000000+01	5.94753320+01	7.00276560+03
5.55000000+01	5.13678490+01	7.00330120+03
5.59999990+01	4.33071000+01	7.00299980+03
5.65000000+01	3.53536360+01	7.00150970+03
5.70000000+01	2.76374500+01	6.99908630+03
5.75000000+01	2.04794070+01	6.99559190+03
5.80000000+01	1.47877272+01	6.99099590+03
5.84999990+01	1.27951632+01	6.98527470+03
5.90000000+01	1.60190520+01	6.97841190+03
5.95000000+01	2.23484870+01	6.97039850+03
5.99999990+01	2.99058170+01	6.96123290+03
6.05000000+01	3.79925880+01	6.95092140+03
6.10000000+01	4.63553640+01	6.93947780+03
6.14999990+01	5.48875740+01	6.92692420+03
6.20000000+01	6.35378970+01	6.91329090+03
6.25000000+01	7.22788730+01	6.89861670+03
6.30000000+01	8.10945750+01	6.88294920+03
6.35000000+01	8.99751580+01	6.86634540+03
6.40000000+01	9.89142270+01	6.84887120+03

TABLE C-2. (Continued)

6.45000000+01	1.07907454+02	6.83060270+03
6.50000000+01	1.16951805+02	6.81162580+03
6.54999990+01	1.26045097+02	6.79203720+03
6.60000000+01	1.35185710+02	6.77194420+03
6.65000000+01	1.44372450+02	6.75146540+03
6.69999990+01	1.53604360+02	6.73073110+03
6.75000000+01	1.62880730+02	6.70988340+03
6.80000000+01	1.72200980+02	6.68907710+03
6.84999990+01	1.81564640+02	6.66847940+03
6.90000000+01	1.90971370+02	6.64827070+03
6.95000000+01	2.00420850+02	6.62864460+03
7.00000000+01	2.09912800+02	6.60963860+03

SEGMENT 5

STATION	SHEAR	MOMENT
7.00000000+01	3.82807290+02	6.60980820+03
7.05000000+01	3.78090670+02	6.45900500+03
7.09999990+01	3.73548080+02	6.30937080+03
7.15000000+01	3.69189140+02	6.16095630+03
7.20000000+01	3.65023640+02	6.01364140+03
7.24999990+01	3.61061570+02	5.86730470+03
7.30000000+01	3.57313030+02	5.72182280+03
7.35000000+01	3.53788190+02	5.57707240+03
7.39999990+01	3.[illegible]97230+02	5.43292850+03
7.45000000+01	3.[illegible]450270+02	5.28926620+03
7.50000000+01	3.44657300+02	5.14595990+03
7.55000000+01	3.42128110+02	5.00288430+03
7.60000000+01	3.39872160+02	4.85991430+03
7.65000000+01	3.37898570+02	4.71692460+03
7.70000000+01	3.36216000+02	4.57379230+03
7.75000000+01	3.34832520+02	4.43039470+03
7.79999990+01	3.33755580+02	4.28661090+03
7.85000000+01	3.32991910+02	4.14232230+03
7.90000000+01	3.32547430+02	3.99741260+03
7.94999990+01	3.32427220+02	3.85176900+03
8.00000000+01	3.32635440+02	3.70528230+03
8.05000000+01	3.33175280+02	3.55784810+03
8.09999990+01	3.34048960+02	3.40936780+03
8.15000000+01	3.35257690+02	3.25[illegible]4990+03
8.20000000+01	3.36801690+02	3.10891180+03
8.25000000+01	3.38680170+02	2.95678180+03
8.30000000+01	3.40891420+02	2.80330230+03
8.34999990+01	3.43432800+02	2.64843440+03
8.40000000+01	3.46300820+02	2.49216280+03
8.45000000+01	3.49491190+02	2.33450530+03
8.49999990+01	3.52998910+02	2.17552420+03
8.55000000+01	3.56818330+02	2.01534540+03
8.60000000+01	3.60943240+02	1.85418670+03
8.64999990+01	3.65366950+02	1.69240330+03
8.70000000+01	3.70082340+02	1.53056300+03
8.75000000+01	3.75082020+02	1.36957300+03
8.80000000+01	3.80358330+02	1.21090370+03
8.85000000+01	3.85903430+02	1.05699280+03
8.90000000+01	3.91709360+02	9.11980390+02
8.95000000+01	3.97768150+02	7.82979260+02
9.00000000+01	4.04071830+02	6.81600160+02

TABLE C-2. (Continued)

SEGMENT 6

STATION	SHEAR	MOMENT
9.00000000+01	3.73821030+02	6.81785110+02
9.04999990+01	3.85360120+02	4.93325380+02
9.10000000+01	3.95224850+02	3.01067310+02
9.15000000+01	4.03409110+02	1.15377484+02
9.19999990+01	4.09907010+02	1.28810470+02
9.25000000+01	4.14712670+02	3.23174680+02

SEGMENT 7

STATION	SHEAR	MOMENT
9.25000000+01	6.23891520+01	3.23133950+02
9.30000000+01	5.84118970+01	2.93297260+02
9.34999990+01	5.44070820+01	2.65552050+02
9.40000000+01	5.03747050+01	2.39878840+02
9.45000000+01	4.63147680+01	2.16298910+02
9.50000000+01	4.22272690+01	1.94832700+02
9.55000000+01	3.81122090+01	1.75498450+02
9.60000000+01	3.39695870+01	1.58309970+02
9.65000000+01	2.97994050+01	1.43273630+02
9.70000000+01	2.56016600+01	1.30384560+02
9.74999990+01	2.13763540+01	1.19622917+02
9.80000000+01	1.71234850+01	1.10951495+02
9.85000000+01	1.28430554+01	1.04317165+02
9.89999990+01	8.53506360+00	9.96577910+01
9.95000000+01	4.19951180+00	9.69150250+01
1.00000000+02	1.63764680-01	9.60952560+01

ENVELOPE OF MAXIMUM LOADS

SEGMENT 1

STATION	SHEAR	MOMENT
0.00000000	0.00000000	3.101645[illegible]0-02
6.25000000-01	2.05195620+00	7.09498930-01
1.25000000+00	3.92801310+00	2.59247070+00
1.87500000+00	5.80009180+00	5.64737720+00
2.50000000+00	7.80606580+00	9.91421450+00
3.12500000+00	9.92842320+00	1.54710696+01
3.75000000+00	1.22673626+01	2.24219720+01
4.37500000+00	1.48940078+01	3.09245580+01
5.00000000+00	1.7788[illegible]300+01	4.11524830+01
5.62500000+00	2.10444620+01	5.33024960+01
6.25000000+00	2.47089040+01	6.76152880+01
6.87500000+00	2.87539550+01	8.43374370+01
7.50000000+00	3.31854470+01	1.03708606+02
8.12500000+00	3.80424800+01	1.25982482+02
8.75000000+00	4.32305560+01	1.51395410+02
9.37500000+00	4.87636030+01	1.80158600+02
1.00000000+01	5.46457190+01	2.12488860+02
1.06250000+01	6.06232770+01	2.48525090+02
1.12500000+01	6.66106340+01	2.88300310+02
1.18750000+01	7.26435160+01	3.31831810+02
1.25000000+01	7.87530700+01	3.79157870+02
1.31250000+01	8.49549610+01	4.30331280+02
1.37500000+01	9.08563330+01	4.85287070+02
1.43750000+01	9.63159550+01	5.437933[illegible]0+02

TABLE C-2. (Continued)

1.50000000+01	1.01364000+02	6.05583410+02
1.56250000+01	1.05854679+02	6.70354250+02
1.62499990+01	1.09878997+02	7.37785660+02
1.68750000+01	1.13403292+02	8.07575060+02
1.75000000+01	1.16218884+02	8.79344010+02
1.81250000+01	1.18200217+02	9.52609020+02
1.87500000+01	1.19466476+02	1.02688420+03
1.93749990+01	1.20086997+02	1.10174230+03
2.00000000+01	1.19843585+02	1.17670840+03
2.06250000+01	1.18563160+02	1.25118390+03
2.12500000+01	1.16330420+02	1.32454070+03
2.18750000+01	1.13094687+02	1.39615890+03
2.24999990+01	1.08717089+02	1.46535490+03
2.31250000+01	1.03175267+02	1.53138820+03
2.37500000+01	9.64480520+01	1.59349460+03
2.43750000+01	8.93118580+01	1.65094760+03
2.50000000+01	1.05597275+02	1.70283190+03

SEGMENT 2

STATION	SHEAR	MOMENT
2.50000000+01	1.35938480+03	1.70303310+03
2.53750000+01	1.36388630+03	1.68711800+03
2.57499990+01	1.36845450+03	1.69080010+03
2.61250000+01	1.37308870+03	1.71442110+03
2.64999990+01	1.37778860+03	1.83193530+03
2.68750000+01	1.38255360+03	2.34915150+03
2.72499990+01	1.38738320+03	2.86837150+03
2.76250000+01	1.39227700+03	3.38950850+03
2.79999990+01	1.39723450+03	3.9[illegible]253150+03
2.83750000+01	1.40225510+03	4.43743260+03
2.87499990+01	1.40733850+03	4.96421510+03
2.91250000+01	1.41248390+03	5.49288760+03
2.94999990+01	1.41769100+03	6.02346270+03
2.98750000+01	1.42295920+03	6.55595410+03
3.02499990+01	1.42828810+03	7.09037710+03
3.06250000+01	1.43367720+03	7.62674790+03
3.09999990+01	1.43912590+03	8.16508260+03
3.13750000+01	1.44463380+03	8.70539810+03
3.17500000+01	1.45020020+03	9.24771140+03
3.21250000+01	1.45582490+03	9.79203950+03
3.25000000+01	1.46150720+03	1.03383998+04
3.28750000+01	1.46724660+03	1.08868092+04
3.32500000+01	1.47304270+03	1.14372849+04
3.36250000+01	1.47889490+03	1.19898439+04
3.40000000+01	1.48480270+03	1.25445038+04
3.43750000+01	1.49076580+03	1.31012812+04
3.47500000+01	1.49678350+03	1.36601932+04
3.51250000+01	1.50285530+03	1.42212569+04
3.55000000+01	1.50890090+03	1.47844889+04
3.58749990+01	1.51515970+03	1.53499063+04
3.62500000+01	1.52139120+03	1.59175258+04
3.66249990+01	1.52767490+03	1.64873640+04
3.70000000+01	1.53401050+03	1.70594370+04
3.73749990+01	1.54039730+03	1.76337620+04
3.77500000+01	1.54683490+03	1.82103560+04
3.81249990+01	1.55332290+03	1.87892340+04

TABLE C-2. (Continued)

3.85000000+01	1.55986070+03	1.93704120+04
3.88749990+01	1.56644300+03	1.99539090+04
3.92500000+01	1.57308430+03	2.05397370+04
3.96249990+01	1.57976900+03	2.11279160+04
4.00000000+01	1.58650180+03	2.17184130+04

SEGMENT 3

STATION	SHEAR	MOMENT
4.00000000+01	8.96058130+02	2.56207160+04
4.04999990+01	8.82849920+02	2.52500060+04
4.10000000+01	8.69653890+02	2.48857480+04
4.15000000+01	8.56471340+02	2.45279540+04
4.19999990+01	8.43303600+02	2.41765630+04
4.25000000+01	8.30152110+02	2.38315120+04
4.30000000+01	8.17018400+02	2.34927330+04
4.34999990+01	8.03904100+02	2.31601580+04
4.40000000+01	7.90810940+02	2.28337120+04
4.45000000+01	7.77740750+02	2.25133200+04
4.50000000+01	7.64695540+02	2.21989040+04
4.55000000+01	7.51677400+02	2.18903810+04
4.59999990+01	7.38688580+02	2.15876650+04
4.65000000+01	7.25731520+02	2.12906700+04
4.70000000+01	7.12808770+02	2.09993010+04
4.74999990+01	6.99923160+02	2.07134680+04
4.80000000+01	6.87077610+02	2.04330710+04
4.85000000+01	6.74275350+02	2.01580100+04
4.89999990+01	6.61519830+02	1.98881840+04
4.95000000+01	6.48814740+02	1.96234880+04
5.00000000+01	6.36724900+02	1.93636970+04

SEGMENT 4

STATION	SHEAR	MOMENT
5.00000000+01	6.36724900+02	1.93637360+04
5.05000000+01	6.25602320+02	1.91086660+04
5.10000000+01	6.15477010+02	1.88579120+04
5.14999990+01	6.05191220+02	1.86113540+04
5.20000000+01	5.94947920+02	1.83689110+04
5.25000000+01	5.84750350+02	1.81304970+04
5.29999990+01	5.74601930+02	1.78960260+04
5.35000000+01	5.64506320+02	1.76654110+04
5.40000000+01	5.54467440+02	1.74385590+04
5.44999990+01	5.44489470+02	1.72153810+04
5.50000000+01	5.34576880+02	1.69957820+04
5.55000000+01	5.24734490+02	1.67796700+04
5.59999990+01	5.14967430+02	1.65669470+04
5.65000000+01	5.05281230+02	1.63575179+04
5.70000000+01	4.95681760+02	1.61512845+04
5.75000000+01	4.86175370+02	1.59481489+04
5.80000000+01	4.76768820+02	1.57480126+04
5.84999990+01	4.67469390+02	1.55507767+04
5.90000000+01	4.58284850+02	1.53563418+04
5.95000000+01	4.49223550+02	1.51646094+04
5.99999990+01	4.40294420+02	1.49754808+04
6.05000000+01	4.31507010+02	1.47888579+04
6.10000000+01	4.22871540+02	1.46046435+04
6.14999990+01	4.14398900+02	1.44227415+04

TABLE C-2. (Continued)

6.20000000+01	4.06100740+02	1.42430569+04
6.25000000+01	3.97989410+02	1.40654964+04
6.30000000+01	3.90078110+02	1.38899685+04
6.35000000+01	3.82380750+02	1.37163841+04
6.40000000+01	3.74912110+02	1.35446564+04
6.45000000+01	3.67687700+02	1.33747014+04
6.50000000+01	3.60723840+02	1.32064379+04
6.54999990+01	3.54037560+02	1.30397887+04
6.60000000+01	3.47646590+02	1.28746803+04
6.65000000+01	3.41569220+02	1.27110433+04
6.69999990+01	3.35824250+02	1.25488127+04
6.75000000+01	3.30430830+02	1.23879292+04
6.80000000+01	3.25408230+02	1.22283382+04
6.84999990+01	3.20775740+02	1.20699915+04
6.90000000+01	3.16552360+02	1.19128473+04
6.95000000+01	3.12756580+02	1.17568707+04
7.00000000+01	3.09406060+02	1.16020290+04

SEGMENT 5

STATION	SHEAR	MOMENT
7.00000000+01	6.96028370+02	1.16020344+04
7.05000000+01	6.89056850+02	1.12860767+04
7.09999990+01	6.82230350+02	1.09728994+04
7.15000000+01	6.75554130+02	1.06624266+04
7.20000000+01	6.69033510+02	1.03545759+04
7.24999990+01	6.62674270+02	1.00492635+04
7.30000000+01	6.56481720+02	9.74640410+03
7.35000000+01	6.504[illegible]1660+02	9.44591190+03
7.39999990+01	6.[illegible]9840+02	9.1[illegible]69970+03
7.45000000+01	6.38962120+02	8.85167920+03
7.50000000+01	6.33494360+02	8.55776170+03
7.55000000+01	6.28222500+02	8.26585760+03
7.60000000+01	6.23152470+02	7.97587700+03
7.65000000+01	6.18290240+02	7.68772940+03
7.70000000+01	6.13641720+02	7.40132470+03
7.75000000+01	6.09212800+02	7.11657250+03
7.79999990+01	6.05009310+02	6.83338370+03
7.85000000+01	6.01037000+02	6.55166980+03
7.90000000+01	5.97301510+02	6.27134410+03
7.94999990+01	5.93808340+02	5.99232180+03
8.00000000+01	5.90562800+02	5.71452160+03
8.05000000+01	5.87570110+02	5.43786620+03
8.09999990+01	5.84835110+02	5.16228390+03
8.15000000+01	5.82362550+02	4.88771030+03
8.20000000+01	5.80156810+02	4.61409080+03
8.25000000+01	5.78222040+02	4.34138440+03
8.30000000+01	5.76562010+02	4.06956750+03
8.34999990+01	5.75180200+02	3.79864130+03
8.40000000+01	5.74079670+02	3.52864100+03
8.45000000+01	5.73263140+02	3.25965030+03
8.49999990+01	5.72732900+02	2.99182280+03
8.55000000+01	5.72490830+02	2.72541600+03
8.60000000+01	5.72538400+02	2.46084750+03
8.64999990+01	5.72876590+02	2.19878770+03
8.70000000+01	5.73506010+02	1.94032540+03
8.75000000+01	5.74426760+02	1.68727210+03

TABLE C-2. (Continued)

8.80000000+01	5.75638540+02	1.44274790+03
8.85000000+01	5.77140610+02	1.21235240+03
8.90000000+01	5.78931780+02	1.00648130+03
8.95000000+01	5.810[illegible]60+02	8.44204370+02
9.00000000+01	5.83374660+02	7.55508290+02
SEGMENT 6		
STATION	SHEAR	MOMENT
9.00000000+01	3.73821030+02	7.55396290+02
9.04999990+01	3.85360120+02	5.70055290+02
9.10000000+01	3.95224850+02	3.78670770+02
9.15000000+01	4.03409110+02	1.82136800+02
9.19999990+01	4.09907010+02	1.28810470+02
9.25000000+01	4.14712670+02	3.23174680+02
SEGMENT 7		
STATION	SHEAR	MOMENT
9.25000000+01	6.66835870+01	3.23133950+02
9.30000000+01	6.23894400+01	2.93297260+02
9.34999990+01	5.80720920+01	2.65552050+02
9.40000000+01	5.37315470+01	2.39878840+02
9.45000000+01	4.93678000+01	2.162[illegible]910+02
9.50000000+01	4.49808550+01	1.94832700+02
9.55000000+01	4.05707110+01	1.75498450+02
9.60000000+01	3.61373660+01	1.58309970+02
9.65000000+01	3.16808220+01	1.43273630+02
9.70000000+01	2.72010770+01	1.30384560+02
9.74999990+01	2.26981330+01	1.19622917+02
9.80000000+01	1.81719890+01	1.10951495+02
9.85000000+01	1.36226448+01	1.04317165+02
9.89999990+01	9.05010000+00	9.96577910+01
9.95000000+01	4.45435520+00	9.69150250+01
1.00000000+02	1.64619750-01	9.60952560+01

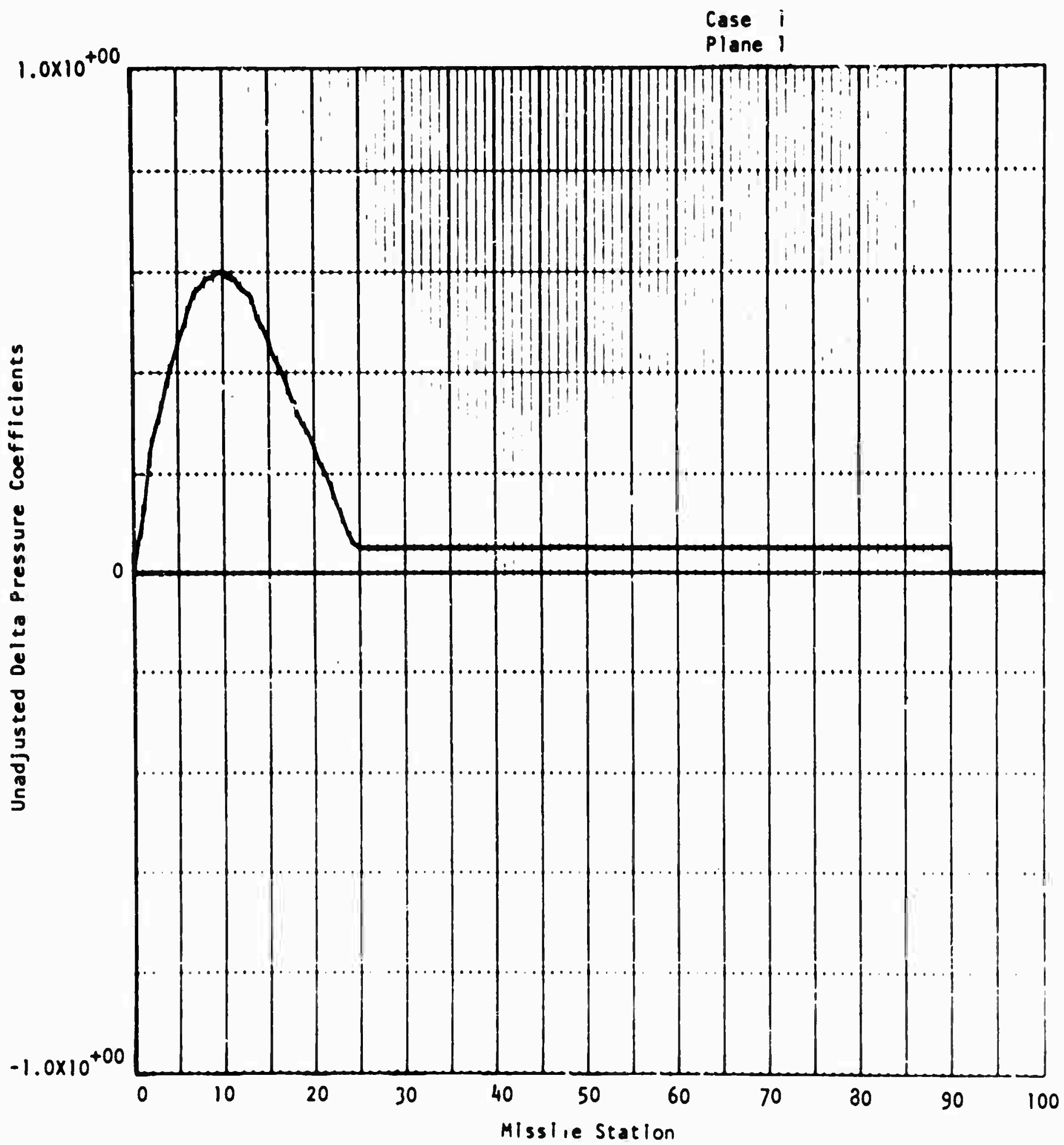

Case i
Plane 1
1.0X10+00
0
-1.0X10+00
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(a).

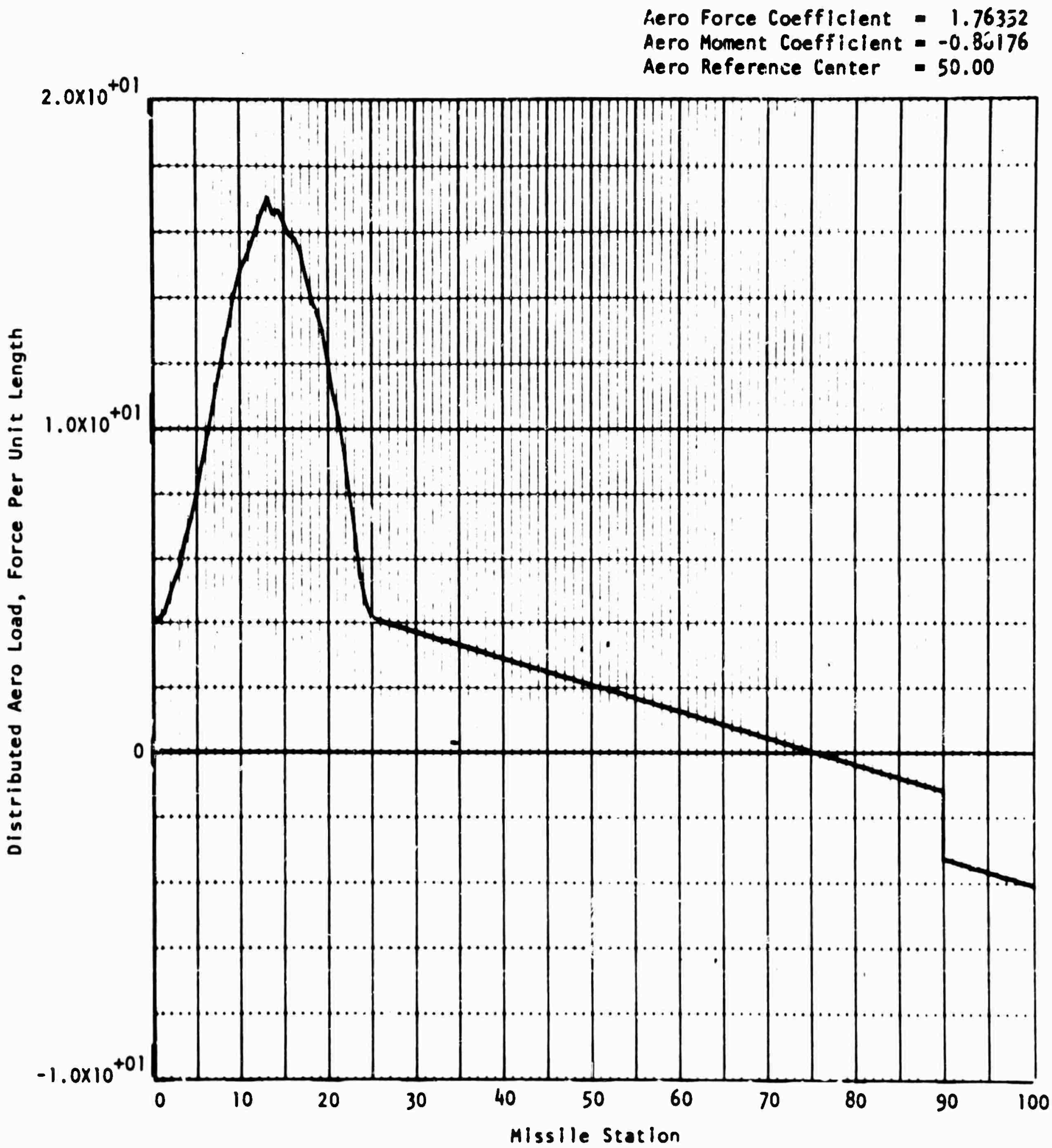

Aero Force Coefficient = 1.76352
Aero Moment Coefficient = -0.86176
Aero Reference Center = 50.00
2.0X10+01
1.0X10+01
0
-1.0X10+01
Distributed Aero Load, Force Per Unit Length
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(b).

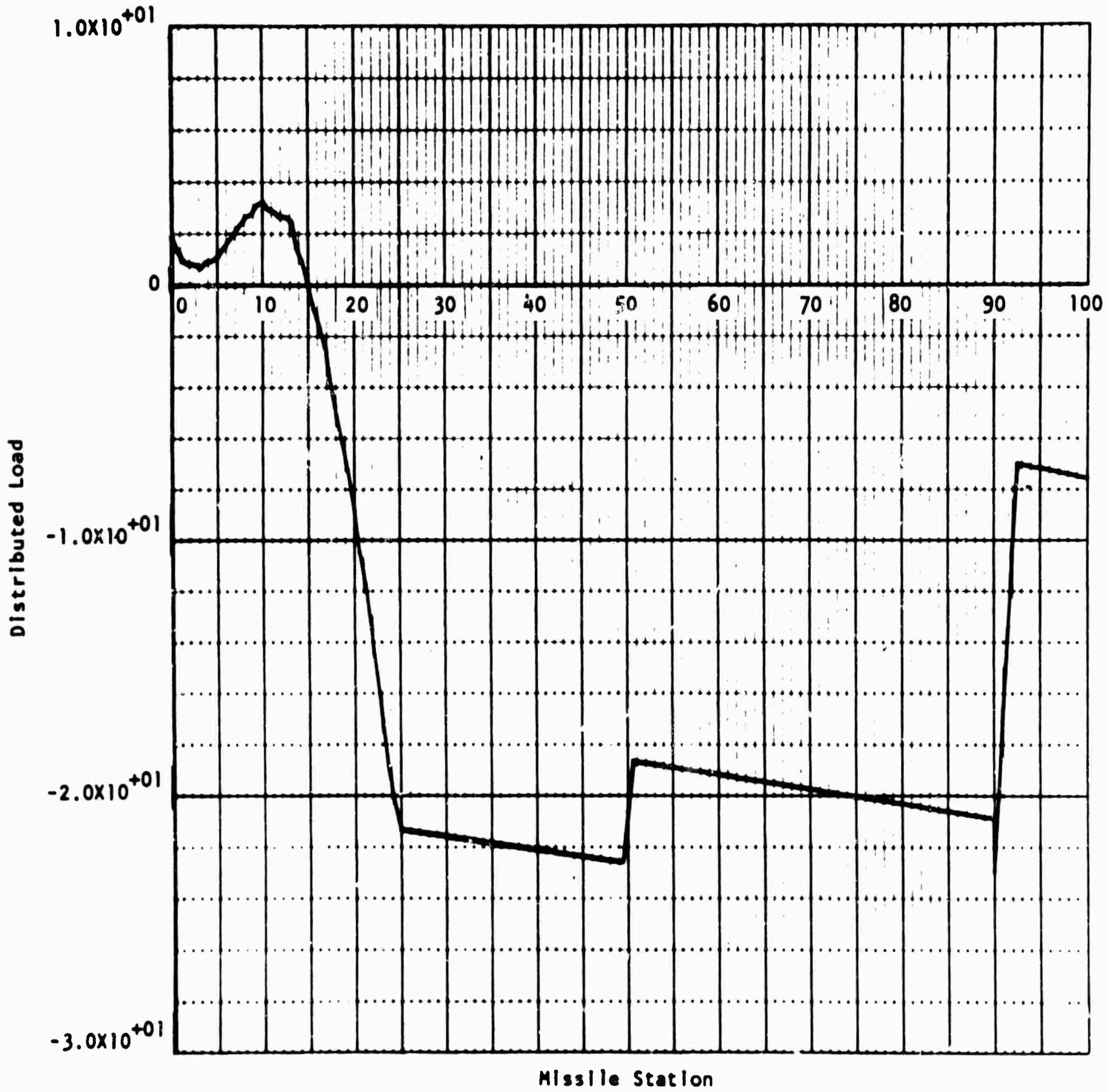

1.0X10+01
0
-1.0X10+01
-2.0X10+01
-3.0X10+01
Distributed Load
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(c).

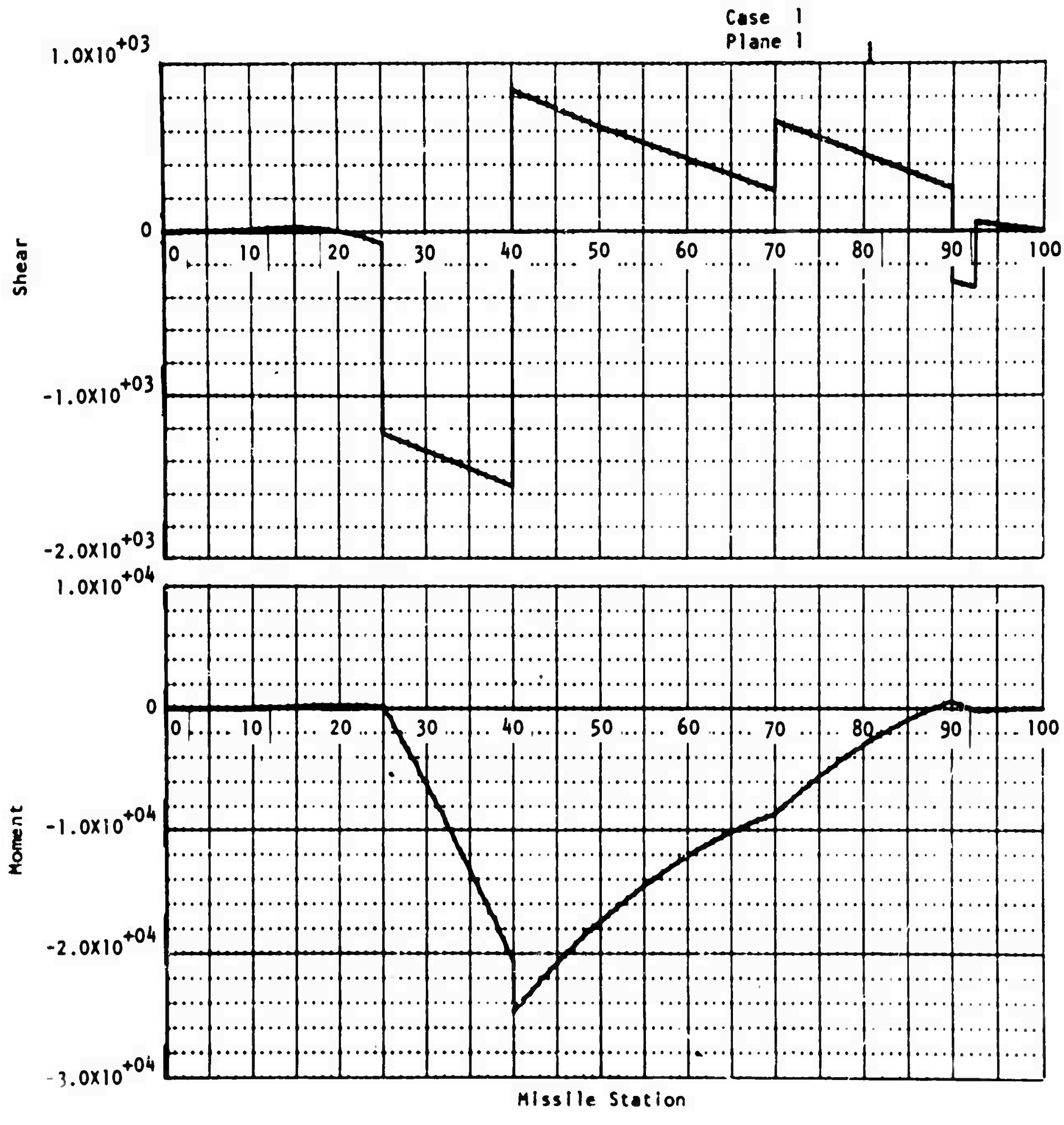

Case 1
Plane 1
1.0X10+03
0
-1.0X10+03
-2.0X10+03
Shear
0 10 20 30 40 50 60 70 80 90 100
1.0X10+04
0
-1.0X10+04
-2.0X10+04
-3.0X10+04
Moment
0 10 20 30 40 50 60 70 80 90 100
Missile Station

FIG. C-2(d).

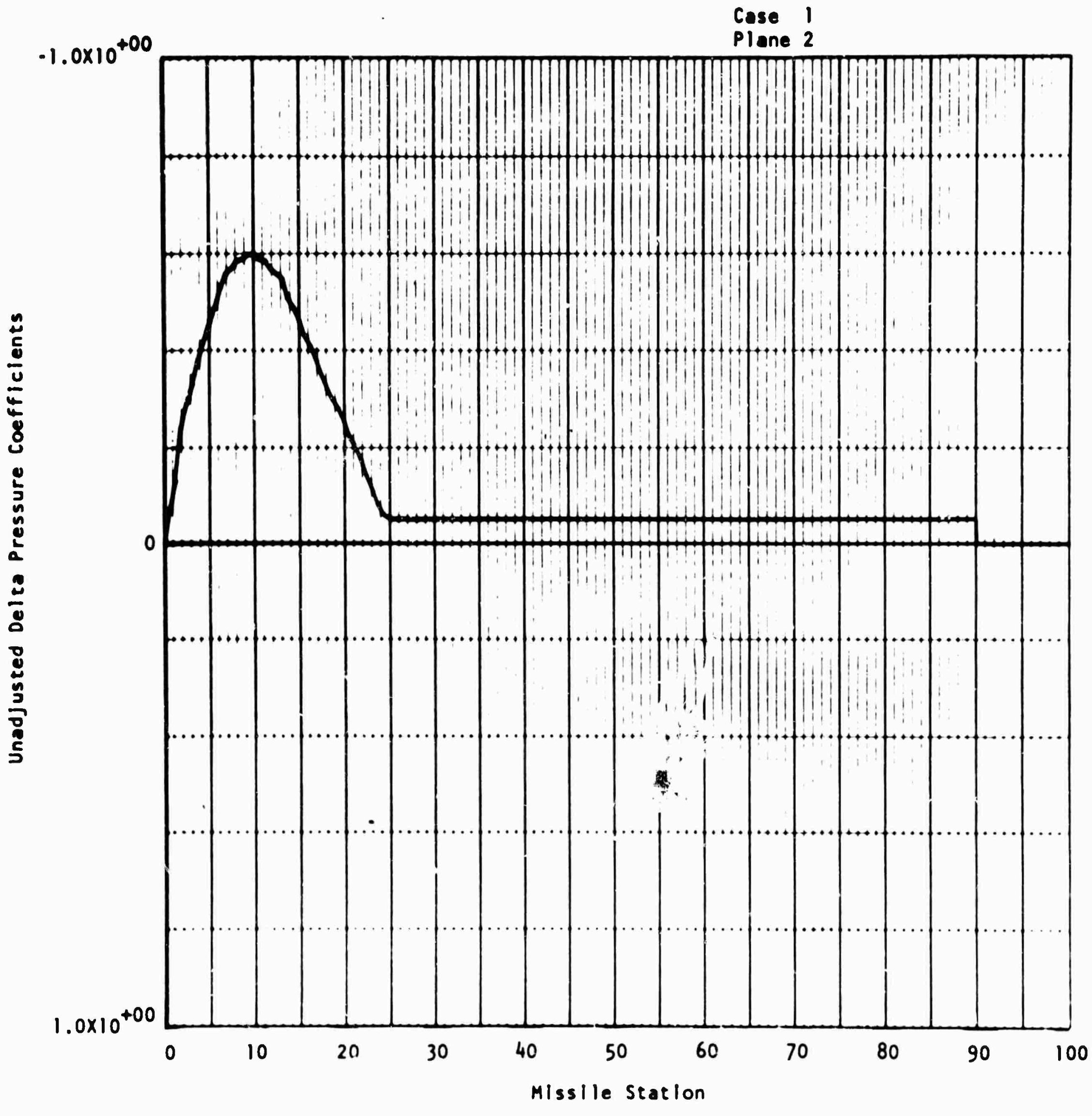
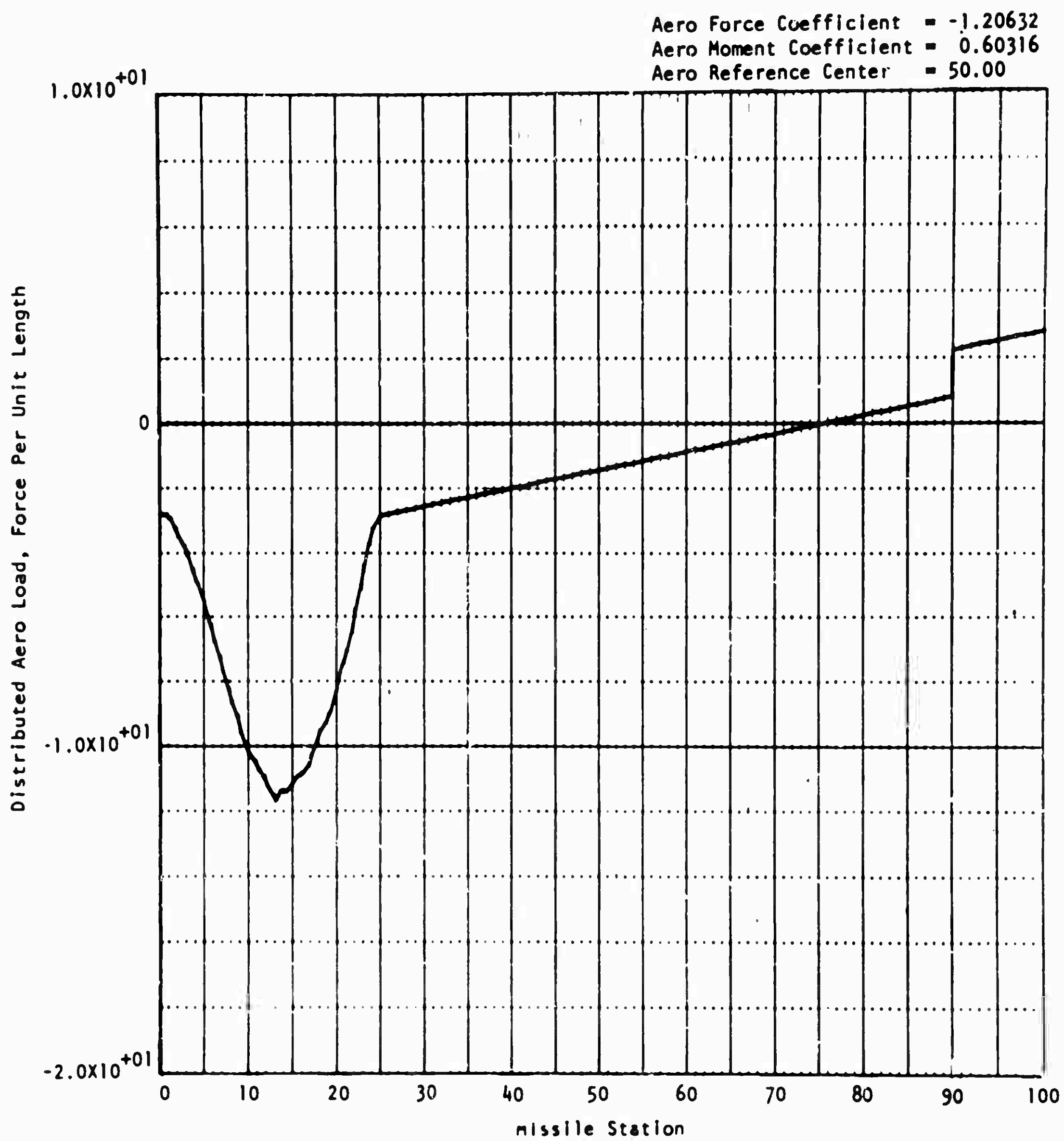

Case 1
Plane 2
-1.0X10+00
0
1.0X10+00
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(e).



Aero Force Coefficient = -1.20632
Aero Moment Coefficient = 0.60316
Aero Reference Center = 50.00
1.0X10+01
0
-1.0X10+01
-2.0X10+01
Distributed Aero Load, Force Per Unit Length
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(f).

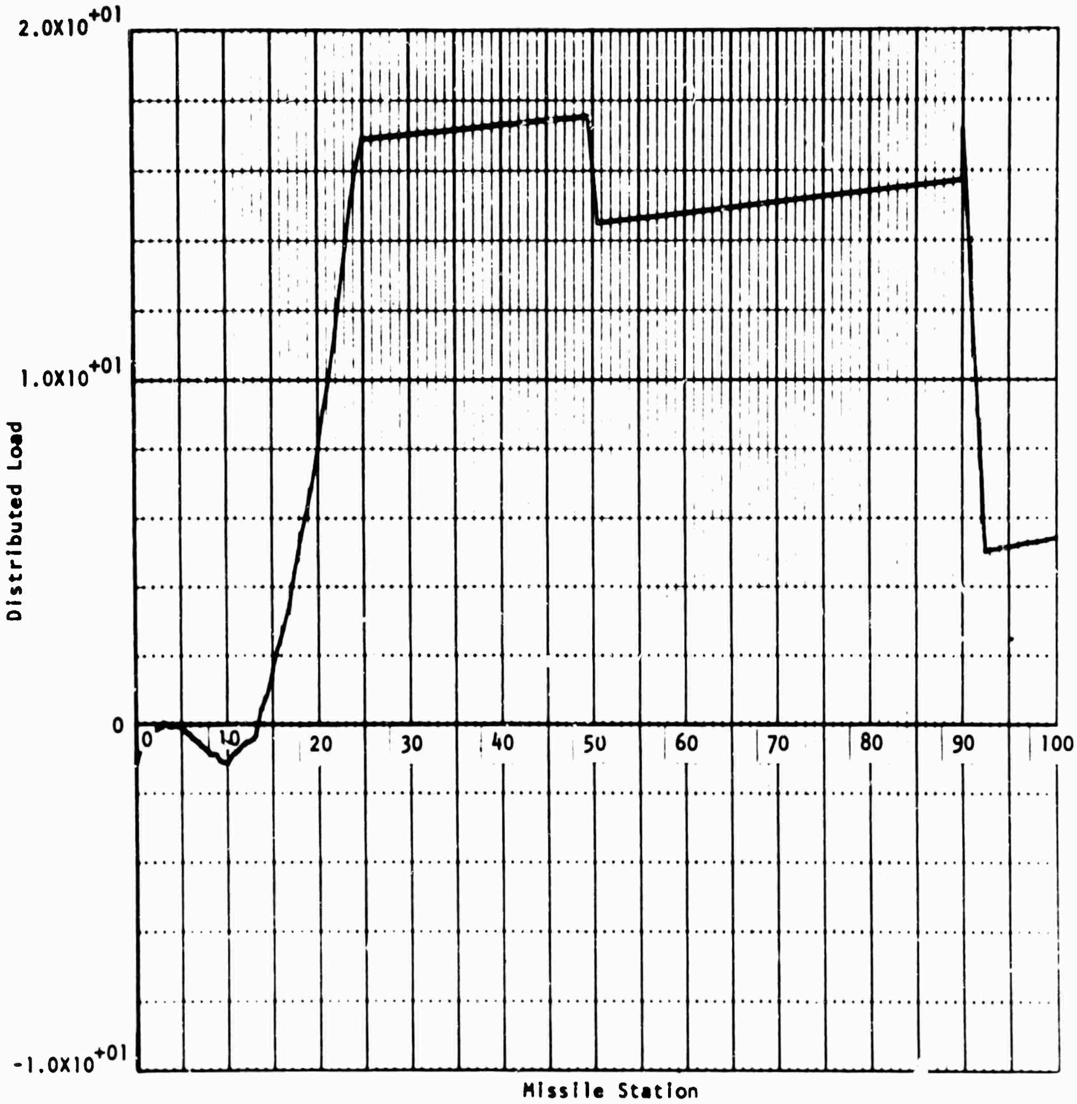

2.0X10+01
1.0X10+01
0
-1.0X10+01
Distributed Load
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(g).

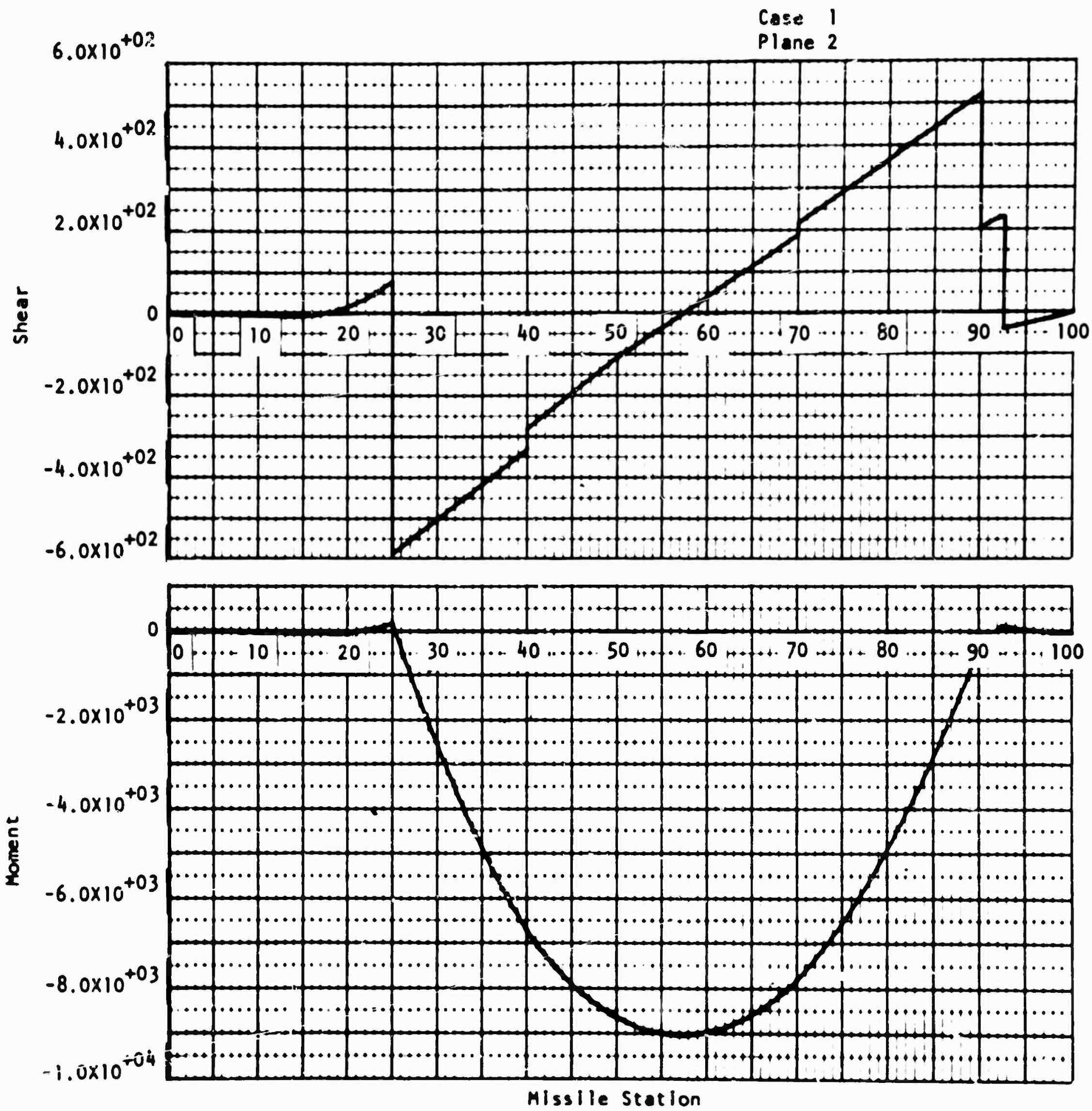

Case 1
Plane 2
6.0X10+02
4.0X10+02
2.0X10+02
0
-2.0X10+02
-4.0X10+02
-6.0X10+02
Shear
0
10
20
30
40
50
60
70
80
90
100
0
-2.0X10+03
-4.0X10+03
-6.0X10+03
-8.0X10+03
-1.0X10+04
Moment
Missile Station

FIG. C-2(h).

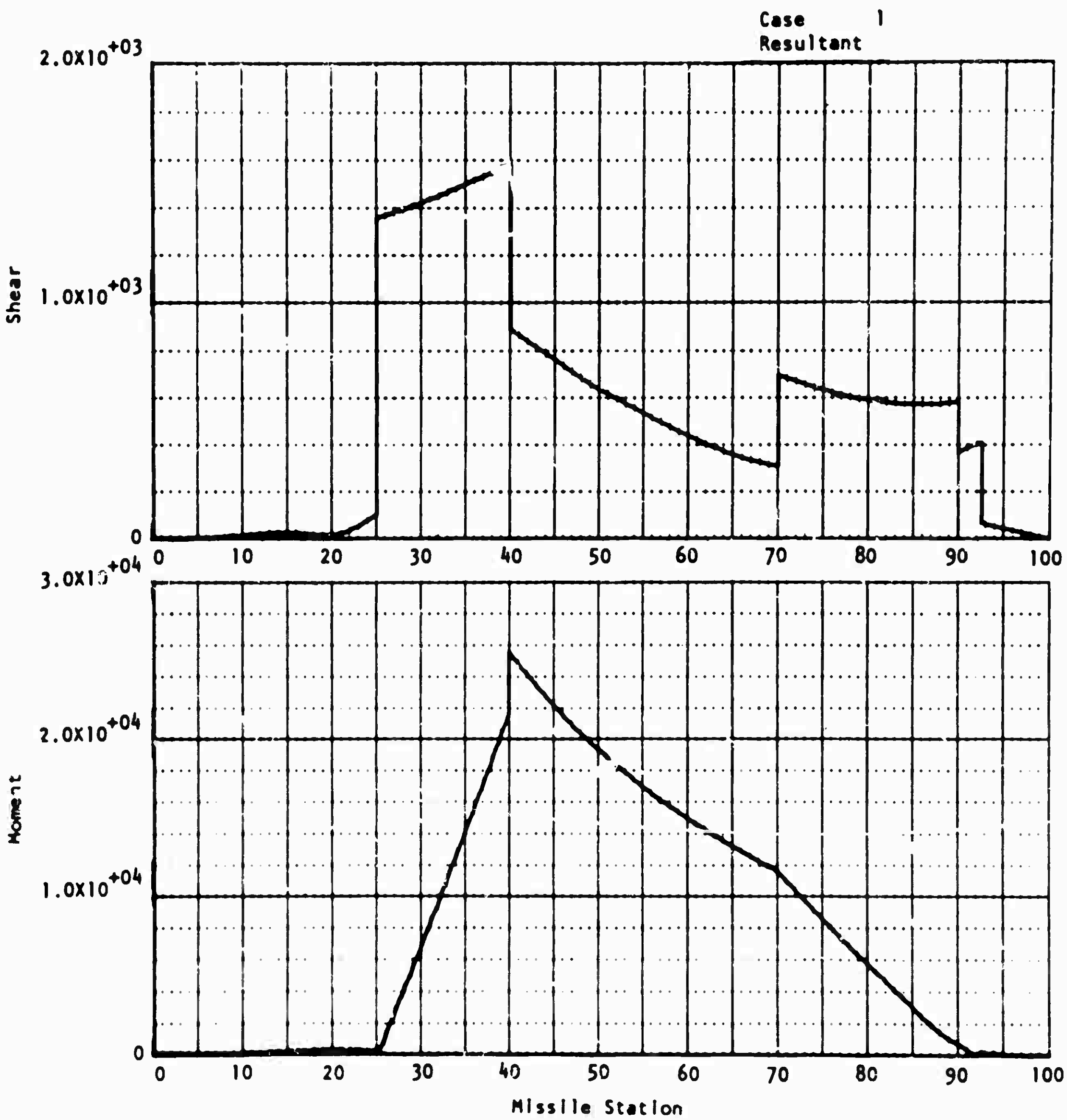

Case 1
Resultant
2.0X10+03
1.0X10+03
0
Shear
0 10 20 30 40 50 60 70 80 90 100
3.0X10+04
2.0X10+04
1.0X10+04
0
Moment
0 10 20 30 40 50 60 70 80 90 100
Missile Station

FIG. C-2(1).

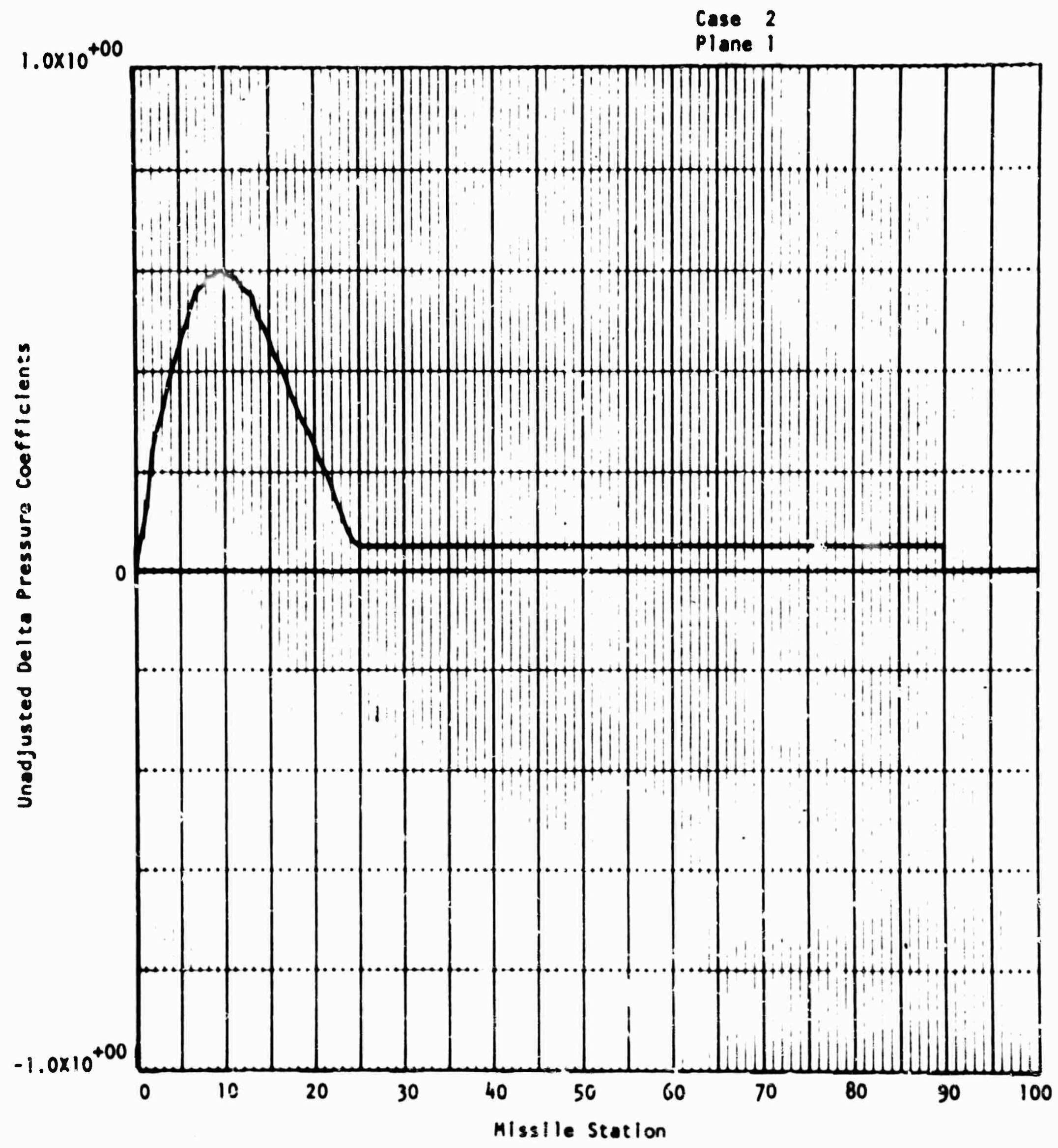

Case 2
Plane 1
1.0X10+00
0
-1.0X10+00
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(j).

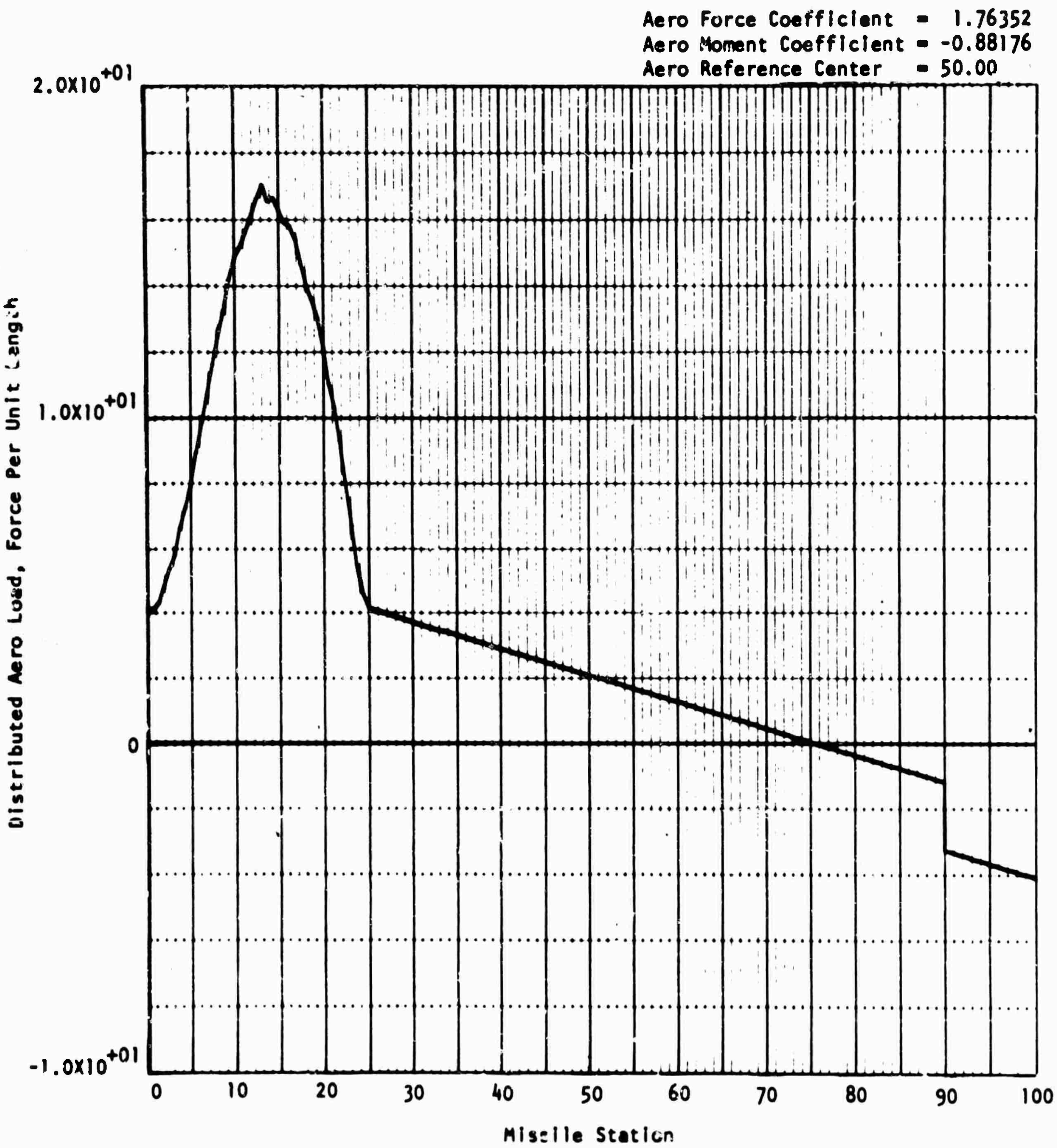

Aero Force Coefficient = 1.76352
Aero Moment Coefficient = -0.88176
Aero Reference Center = 50.00
2.0X10+01
1.0X10+01
0
-1.0X10+01
Distributed Aero Load, Force Per Unit Length
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(k).

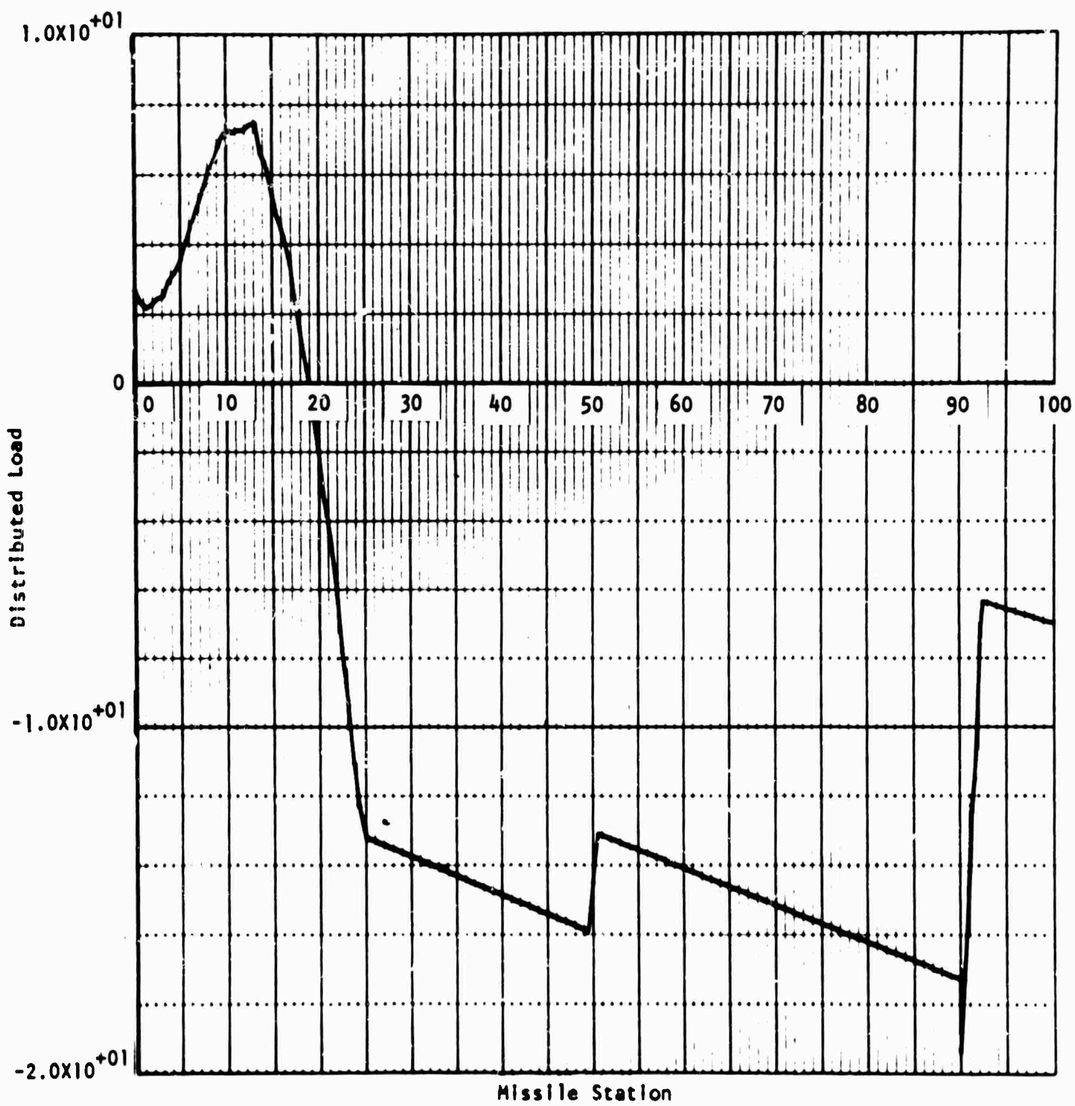

1.0X10+01
0
-1.0X10+01
-2.0X10+01
Distributed Load
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(1).

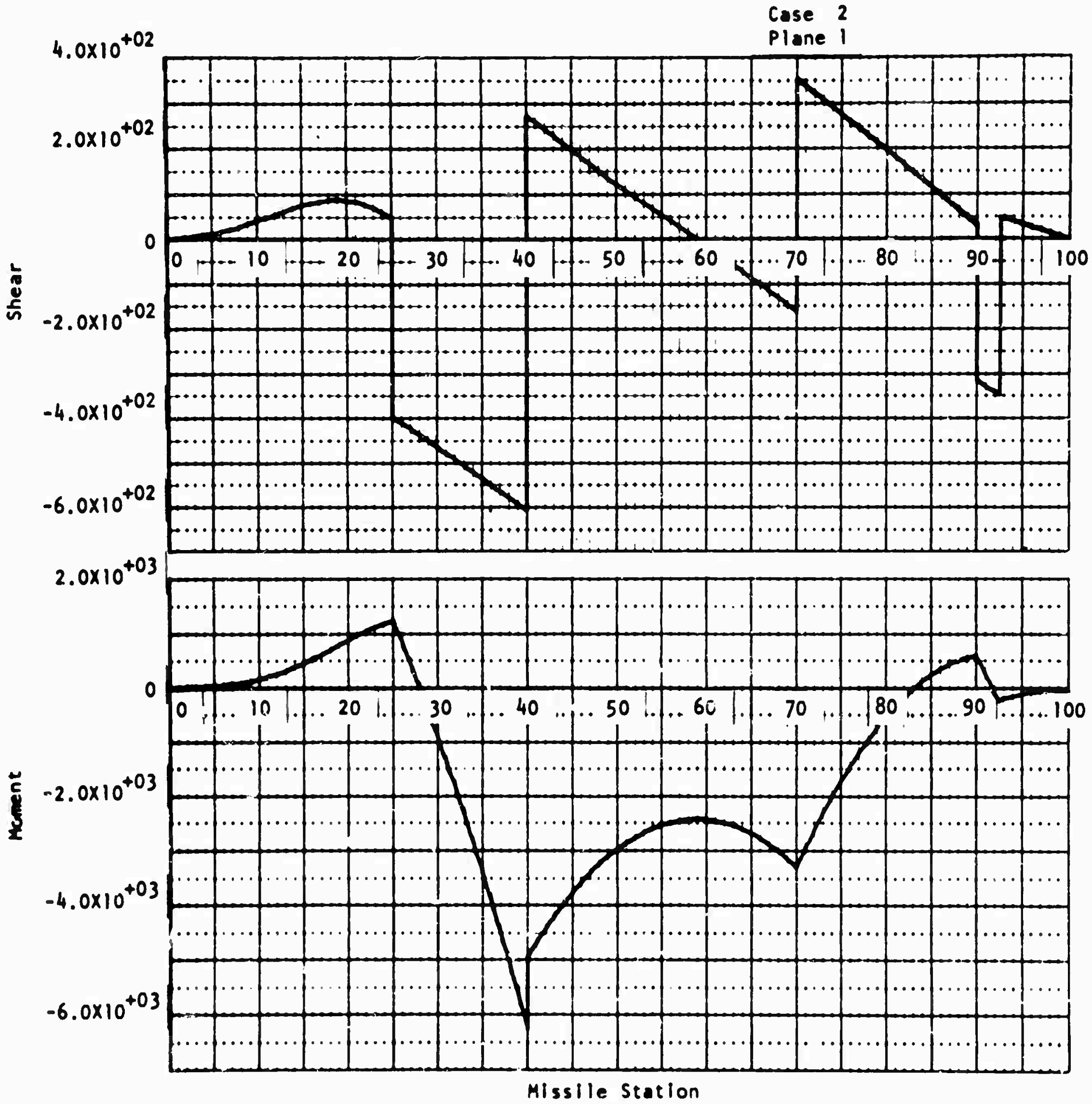

Case 2
Plane 1
4.0X10+02
2.0X10+02
0
-2.0X10+02
-4.0X10+02
-6.0X10+02
Shear
0 10 20 30 40 50 60 70 80 90 100
2.0X10+03
0
-2.0X10+03
-4.0X10+03
-6.0X10+03
Moment
0 10 20 30 40 50 60 70 80 90 100
Missile Station

FIG. C-2(m).

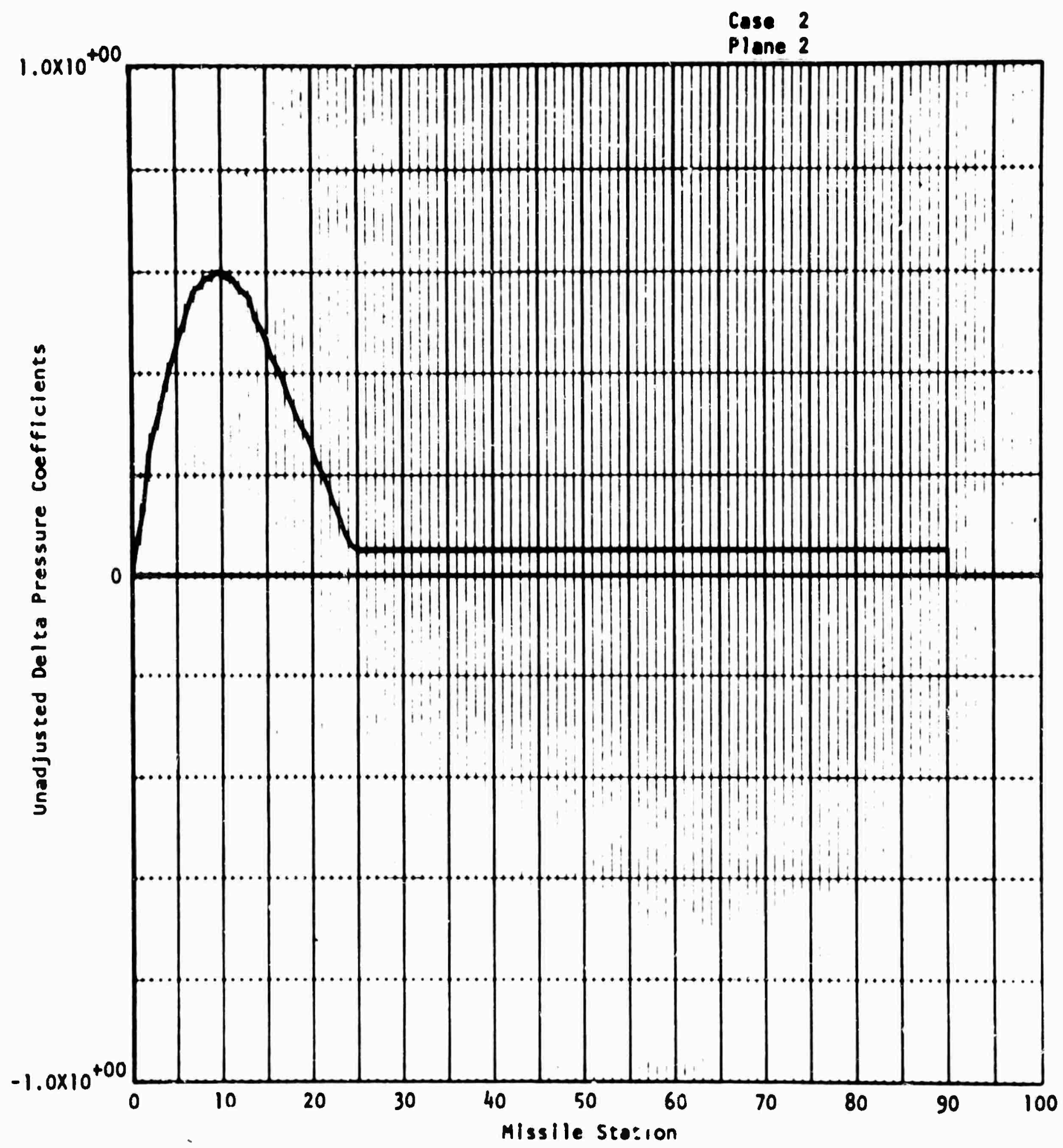

Case 2
Plane 2
1.0X10+00
0
-1.0X10+00
Unadjusted Delta Pressure Coefficients
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(n).

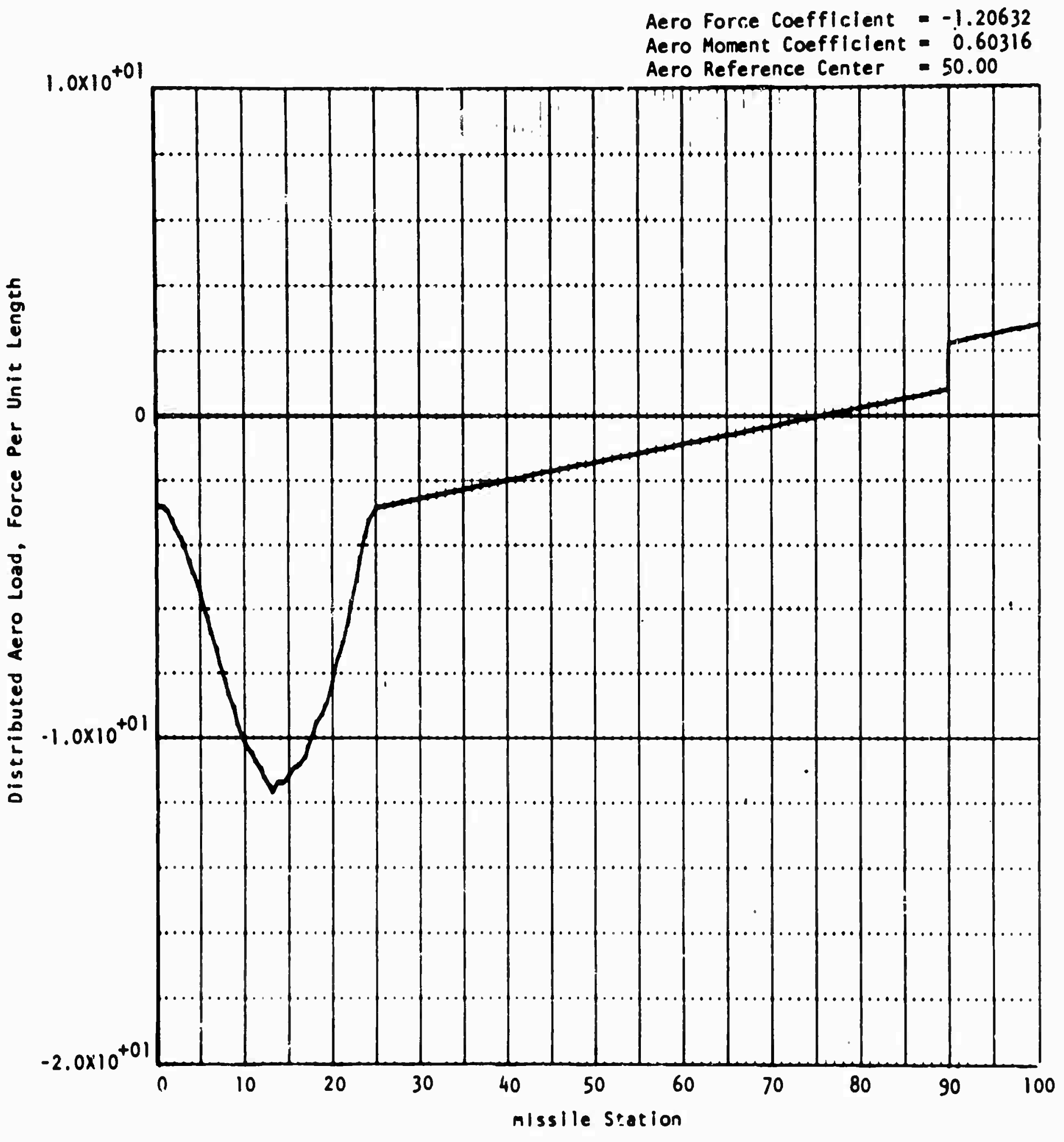

Aero Force Coefficient = -1.20632
Aero Moment Coefficient = 0.60316
Aero Reference Center = 50.00
1.0X10+01
0
-1.0X10+01
-2.0X10+01
Distributed Aero Load, Force Per Unit Length
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(o).

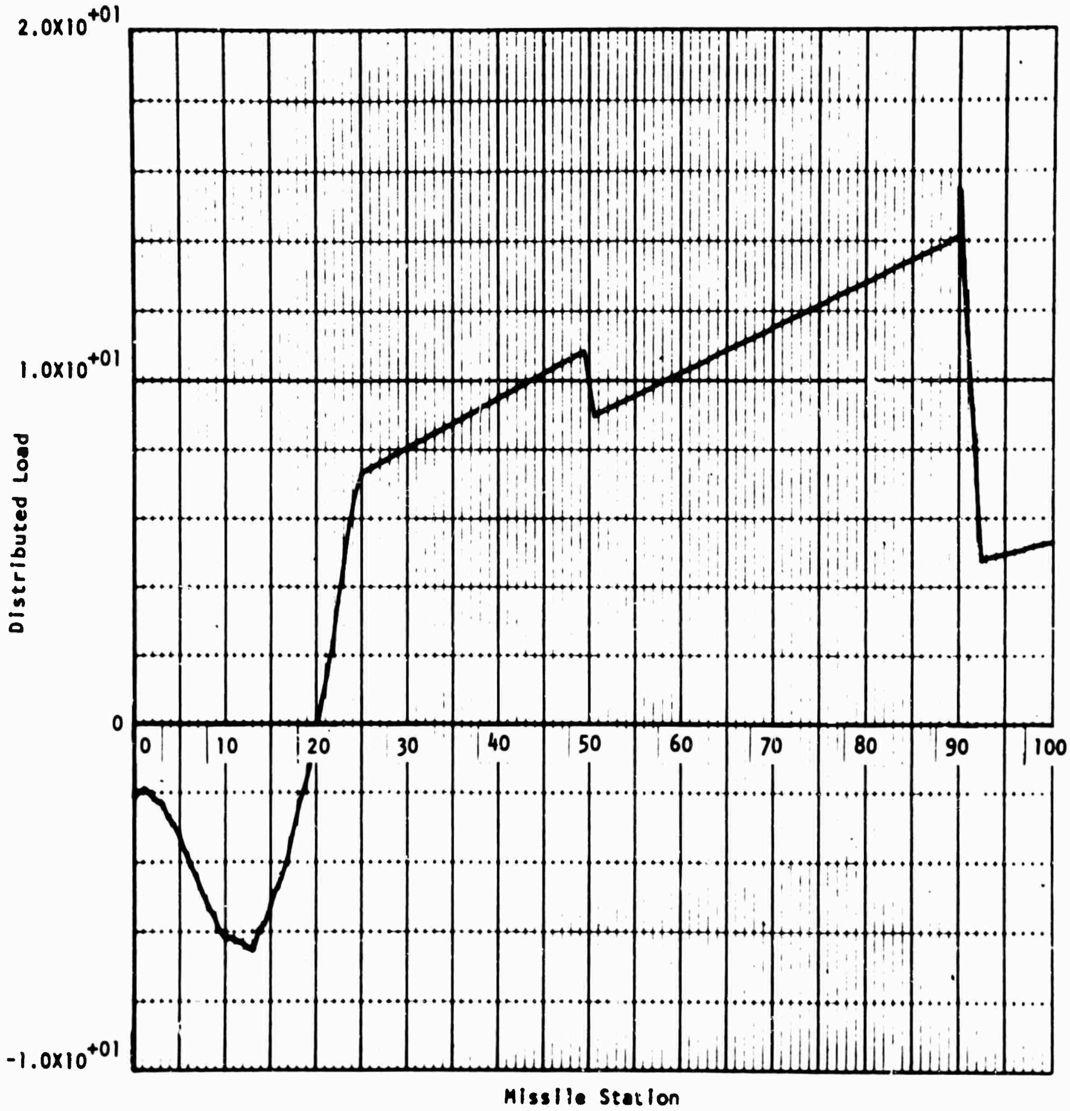

2.0X10+01
1.0X10+01
0
-1.0X10+01
Distributed Load
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(p).

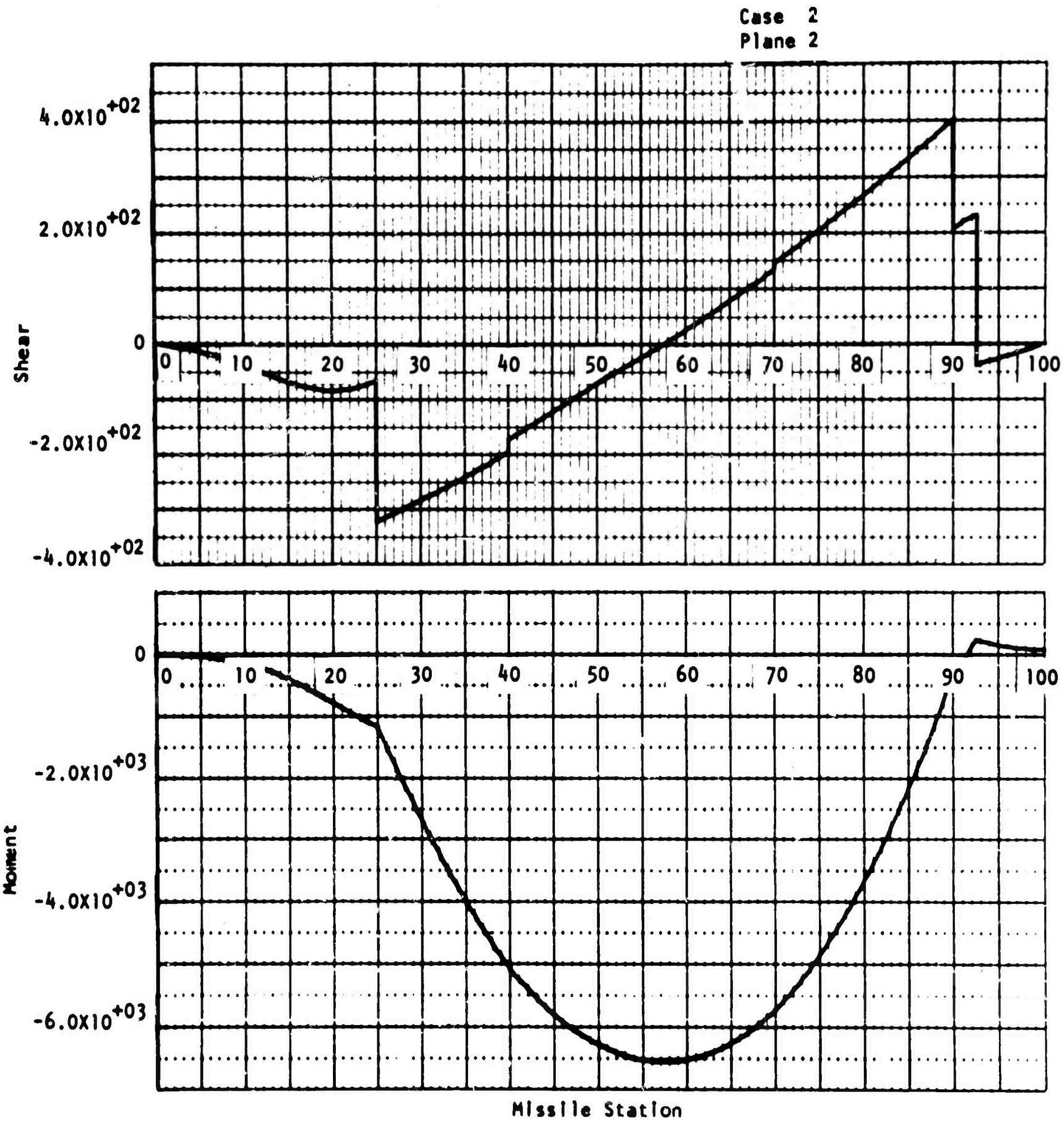

Case 2
Plane 2
4.0X10+02
2.0X10+02
0
-2.0X10+02
-4.0X10+02
Shear
0
10
20
30
40
50
60
70
80
90
100
0
-2.0X10+03
-4.0X10+03
-6.0X10+03
Moment
Missile Station

FIG. C-2(q).

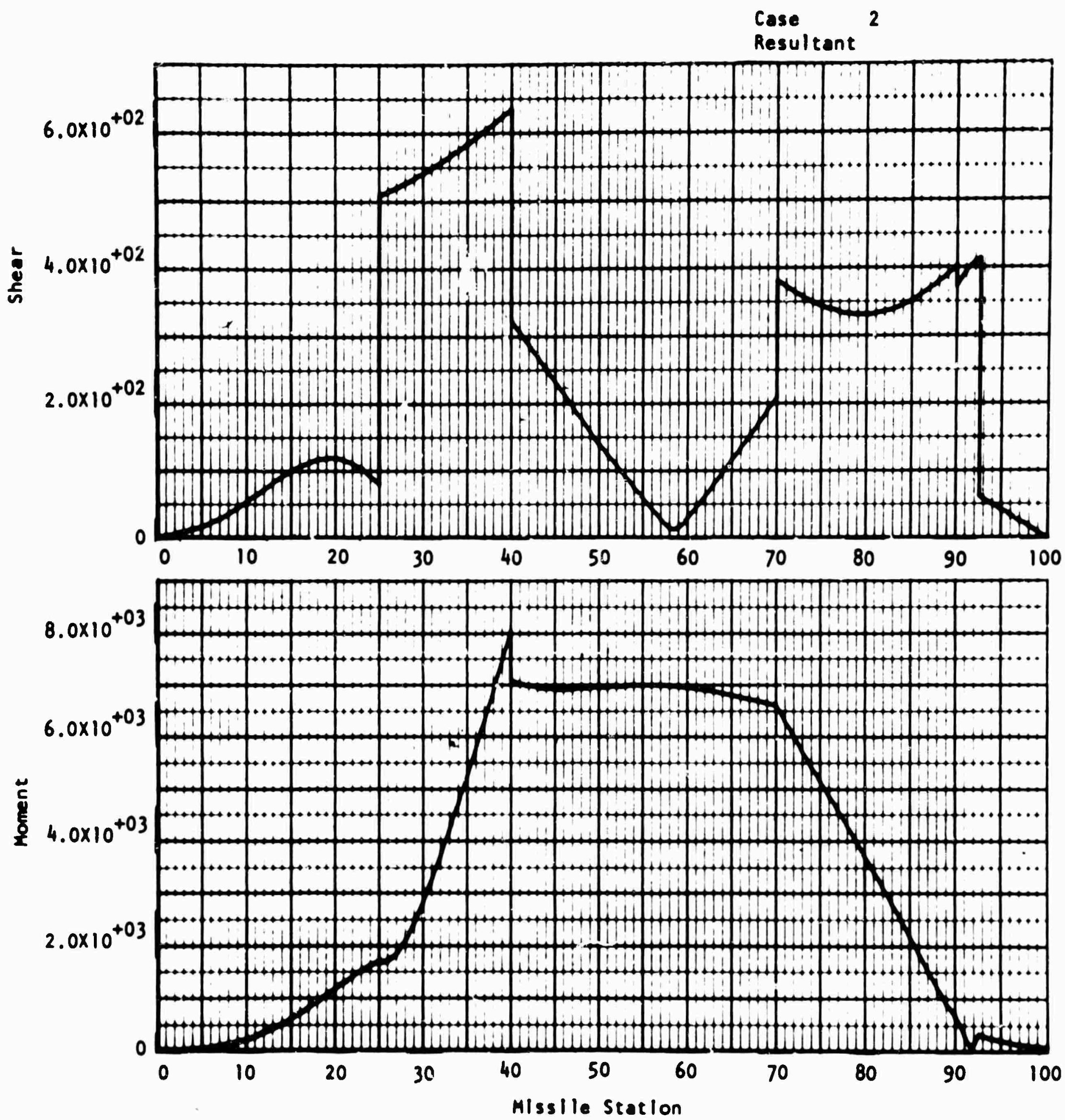

Case 2
Resultant
Shear
6.0X10+02
4.0X10+02
2.0X10+02
0
0
10
20
30
40
50
60
70
80
90
100
Moment
8.0X10+03
6.0X10+03
4.0X10+03
2.0X10+03
0
0
10
20
30
40
50
60
70
80
90
100
Missile Station

FIG. C-2(r).

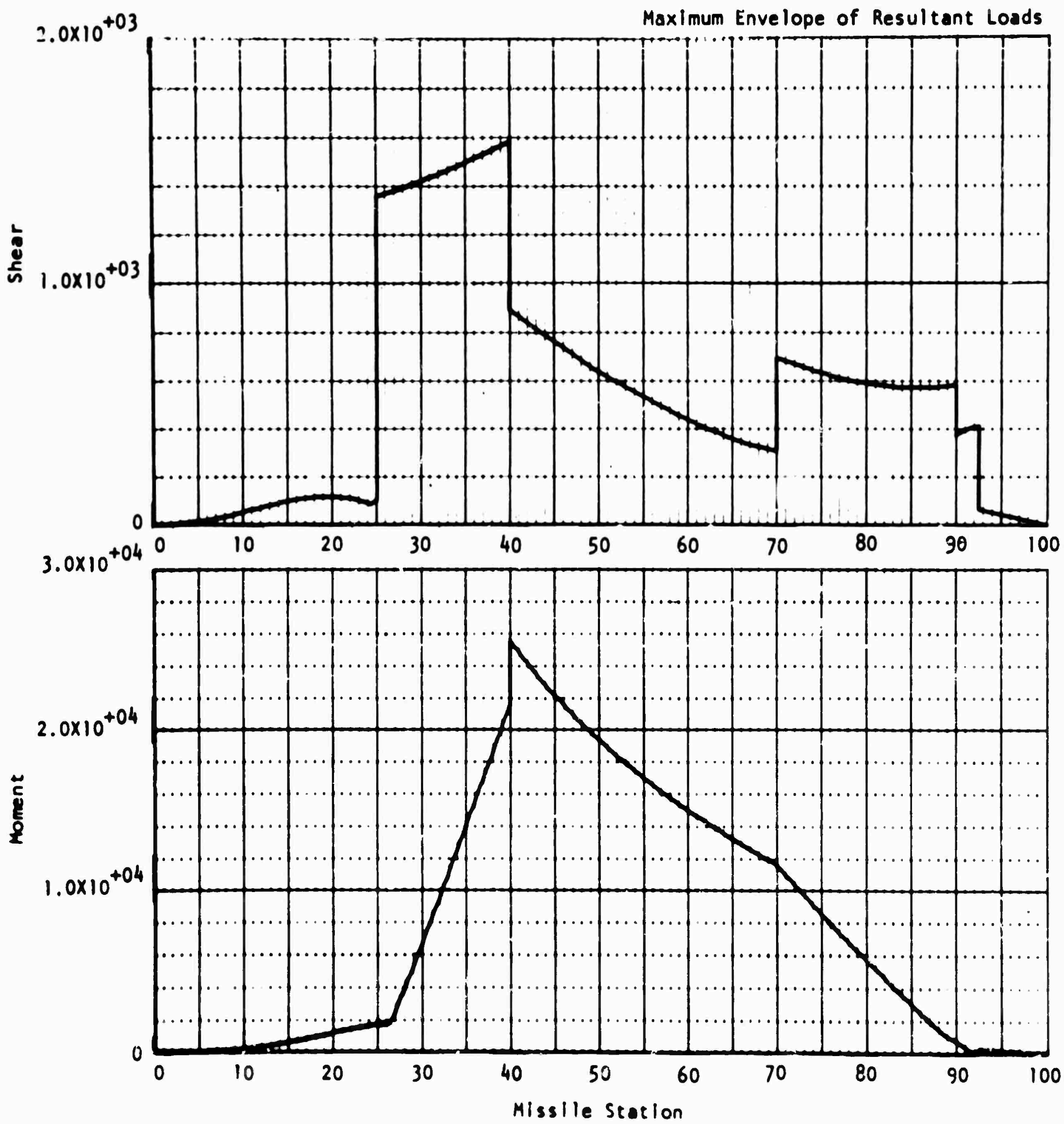

Maximum Envelope of Resultant Loads
2.0X10+03
1.0X10+03
0
Shear
0 10 20 30 40 50 60 70 80 90 100
3.0X10+04
2.0X10+04
1.0X10+04
0
Moment
0 10 20 30 40 50 60 70 80 90 100
Missile Station

FIG. C-2(s).

Appendix D

TABULATION OF VARIABLES IN COMMON

This appendix contains a tabulation of all variables in COMMON between the various subroutines of the airborne stores carriage loads computer program. Also given in parentheses are current maximum dimensions for those variables having subscripts. The order of variables tabulated under subroutine names indicates which variables are in COMMON with each other, just as it does with FORTRAN COMMON statements. Variables with an initial "Z" followed by a numeral (Z1, Z2, ..., Z18) are dummies designed to prevent COMMON associations being made between similarly-named variables in some subroutines. However, sometimes unnecessary COMMON associations are made.

Item	MAIN	HANGER/A	HANGER/B	AIRLOD	AMCOEF	SMDIAG
1	WT	W	W	Z1	Z1	Z1
2	CORRI	WIP	WIP	CORRI	CORRI	CORRI
3	D2THE	D2THE	D2THE	D2THE	D2THE	Z2
4	D2PSI	D2PSI	D2PS1	D2PSI	D2PSI	Z3
5	GX	GX	GX	GX	GX	Z4
6	GY	GY	GY	GY	GY	Z5
7	GZ	GZ	GZ	TZ	GZ	Z6
8	HFH	HF	H	HF	HF	HF
9	HDC	HD	C	HD	HD	HD
10	HRE	HR	E	HR	HR	HR
11	BHANGR	B	B	BHANGR	BHANGR	BHANGR
12	CBAR	CBAR	CBAR	CBAR	CBAR	CBAR
13	S	S	S	S	S	S
14	RHO	RHO	RHO	RHO	RHO	RHO
15	V	V	V	V	V	V
16	CL	CL	CL	Z8	Z8	Z8
17	CM	CM	CM	Z9	Z9	Z9
18	CY	CY	CY	Z10	Z10	Z10
19	CN	CN	CN	Z11	Z11	Z11
20	CD	CD	CD	CD	CD	CD
21	ARC	ARC	ARC	ARC	ARC	ARC
22	Q	Q	Q	Q	Q	Q
23	ISEGS	ISEGS	ISEGS	ISEGS	ISEGS	ISEGS
24	A(25)	A(25)	A(25)	A(25)	A(25)	A(25)
25	B(25)	B(25)	B(25)	B(25)	B(25)	B(25)

Item	MAIN	HANGER/A	HANGER/B	AIRLOD	AMCOEF	SMDIAG
26	N(25)	N(25)	N(25)	N(25)	N(25)	N(25)
27	NOPT(25)	NOPT(25)	NOPT(25)	NOPT(25)	NOPT(25)	NOPT(25)
28	CONCAF(25)	Z13(25)	Z13(25)	CONCAF(25)	CONCAF(25)	CONCAF(25)
29	CONCAM(25)	Z14(25)	Z14(25)	CONCAM(25)	CONCAM(25)	CONCAM(25)
30	X(41,25)	X(41,25)	X(41,25)	X(41,25)	X(41,25)	X(41,25)
31	DELCP(41,25)	DELCP(41,25)	DELCP(41,25)	DELCP(41,25)	DELCP(41,25)	DELCP(41,25)
32	D(41,25)	D(41,25)	D(41,25)	D(41,25)	D(41,25)	D(41,25)
33	CONCHL(25)	Z15(25)	Z15(25)	Z15(25)	Z15(25)	CONCHL(25)
34	CONCHM(25)	Z16(25)	Z16(25)	Z16(25)	Z16(25)	CONCHM(25)
35	W(41,25)	Z17(41,25)	Z17(41,25)	Z17(41,25)	Z17(41,25)	W(41,25)
36	AERO(41,25)	AERO(41,25)	AERO(41,25)	AERO(41,25)	AERO(41,25)	AERO(41,25)
37	XISECT(41,25)	XISECT(41,25)	XISECT(41,25)	XISECT(41,25)	XISECT(41,25)	XISECT(41,25)
38	XCG	XCG	XCG	XCG	XCG	XCG
39	IPLANE	IPLANE	IPLANE	IPLANE	IPLANE	IPLANE
40	IBATCH	IBATCH	IBATCH	IBATCH	IBATCH	IBATCH
41	H(25)	H(25)	Z18(25)	H(25)	H(25)	H(25)
42	RALPHA	RALPHA	RALPHA	RALPHA	RALPHA	RALPHA
43	RHSTA	RHSTA	RHSTA	RHSTA	RHSTA	RHSTA
44	FHSTA	FHSTA	FHSTA	FHSTA	FHSTA	FHSTA
45	RSBSTA	RSBSTA	RSBSTA	RSBSTA	RSBSTA	RSBSTA
46	FSBSTA	FSBSTA	FSBSTA	FSBSTA	FSBSTA	FSBSTA
47	WIPSI	WIPSI	WIPSI	WIPSI	WIPSI	WISPI
48	CANT	GAM	GAM	GAM	GAM	GAM
49	FETAF	BF	BF	BF	BF	BF
50	BETAA	BA	BA	BA	BA	BA

Item	MAIN	HANGER/A	HANGER/B	AIRLOD	AMCOEF	SMDIAG
51	WNGCLA(2)	WNGCLA(2)	WNGCLA(2)	WNGCLA(2)	WNGCLA(2)	WNGCLA(2)
52	WNGCMA(2)	WNGCMA(2)	WNGCMA(2)	WNGCMA(2)	WNGCMA(2)	WNGCMA(2)
53	FINCLA(2)	FINCLA(2)	FINCLA(2)	FINCLA(2)	FINCLA(2)	FINCLA(2)
54	FINCMA(2)	FINCMA(2)	FINCMA(2)	FINCMA(2)	FINCMA(2)	FINCMA(2)
55	ISFHGR	ISFHGR	ISFHGR	ISFHGR	ISFHGR	ISFHGR
56	ISRHGR	ISRHGR	ISRHGR	ISRHGR	ISRHGR	ISRHGR
57	ISFSB	ISFSB	ISFSB	ISFSB	ISFSB	ISFSB
58	ISRSB	ISRSB	ISRSB	ISRSB	ISRSB	ISRSB
59	ISDTNT	ISDTNT	ISDTNT	ISDTNT	ISDTNT	ISDTNT
60	ISFIN	ISFIN	ISFIN	ISFIN	ISFIN	ISFIN
61	ISWING	ISWING	ISWING	ISWING	ISWING	ISWING
62	ISHM	ISHM	ISHM	ISHM	ISHM	ISHM
63	RAD	RAD	RAD	RAD	RAD	RAD
64	XL			XL		XL
65	XR			XR		XR
66	DX			DX		DX
67	DY			DY		DY
68	NRT			NRT		NRT
69	MRT			MRT		MRT
70	ILABL			ILABL		ILABL
71	JLABL			JLABL		JLABL
72	NX			NX		NX
73	NY			NY		NY
74	MRKPT			MRKPT		MRKPT
75	LIN			LIN		LIN

Item	MAIN	HANGER/A	HANGER/B	AIRLOD	AMCOEF	SMDIAG
76	LINXL			LINXL		LINXL
77	LINX2			LINX2		LINX2
78	LINY1			LINY1		LINY1
79	LINY2			LINY2		LINY2
80	IXL			IXL		IXL
81	IXR			IXR		IXR
82	IYB			IYB		IYB
83	IYT			IYT		IYT
84	XSMAX(41,25)					
85	XMMAX(41,25)					
86	CXS(41,25)					
87	CSM(41,25)					

Item	PINTEG	CONCLD	RSLTNT	ENVLOP	SCALE
1	Z1	Z1	Z1	Z1	Z1
2	CORRI	CORRI	CORRI	CORRI	CORRI
3	Z2	Z2	Z2	Z2	Z2
4	Z3	Z3	Z3	Z3	Z3
5	Z4	Z4	Z4	Z4	Z4
6	Z5	Z5	Z5	Z5	Z5
7	Z6	Z6	Z6	Z6	Z6
8	HF	HF	HF	HF	HF
9	HD	HD	HD	HD	HD
10	HR	HR	HR	HR	HR
11	BHANGR	BHANGR	BHANGR	BHANGR	BHANGR
12	CBAR	CBAR	CBAR	CBAR	CBAR
13	Z7	Z7	Z7	Z7	Z7
14	RHO	RHO	RHO	RHO	RHO
15	V	V	V	V	V
16	Z8	Z8	Z8	Z8	Z8
17	Z9	Z9	Z9	Z9	Z9
18	Z10	Z10	Z10	Z10	Z10
19	Z11	Z11	Z11	Z11	Z11
20	CD	CD	CD	CD	CD
21	ARC	ARC	ARC	ARC	ARC
22	Q	Q	Q	Q	Q
23	ISEGS	ISEGS	ISEGS	ISEGS	ISEGS
24	A(25)	A(25)	A(25)	A(25)	A(25)
25	B(25)	B(25)	B(25)	B(25)	B(25)
26	N(25)	N(25)	N(25)	N(25)	N(25)
27	NOPT(25)	NOPT(25)	NOPT(25)	NOPT(25)	NOPT(25)
28	Z13(25)	CONCAF(25)	Z13(25)	Z13(25)	Z13(25)
29	Z14(25)	CONCAM(25)	Z14(25)	Z14(25)	Z14(25)
30	X(41,25)	X(41,25)	X(41,25)	X(41,25)	X(41,25)
31	DELCP(41,25)	DELCP(41,25)	DELCP(41,25)	DELCP(41,25)	DELCP(41,25)
32	D(41,25)	D(41,25)	D(41,25)	D(41,25)	D(41,25)
33	Z15(25)	CONCHL(25)	Z15(25)	Z15(25)	Z15(25)
34	Z16(25)	CONCHM(25)	Z16(25)	Z16(25)	Z16(25)
35	W(41,25)	Z17(41,25)	W(41,25)	Z17(41,25)	W(41,25)
36	AERO(41,25)	AERO(41,25)	AERO(41,25)	AERO(41,25)	AERO(41,25)
37	XISECT(41,25)	XISECT(41,25)	XISECT(41,25)	XISECT(41,25)	XISECT(41,25)
38	XCG	XCG	XCG	XCG	XCG
39	IPLANE	IPLANE	IPLANE	IPLANE	IPLANE
40	IBATCH	IBATCH	IBATCH	IBATCH	IBATCH

Item	PINTEG	CONCLD	RSLTNT	ENVLOP	SCALE
41	H(25)	Z18(25)	H(25)	Z18(25)	H(25)
42	RALPHA	RALPHA	RALPHA	RALPHA	RALPHA
43	RHSTA	RHSTA	RHSTA	RHSTA	RHSTA
44	FHSTA	FHSTA	FHSTA	FHSTA	FHSTA
45	RSBSTA	RSBSTA	RSBSTA	RSBSTA	RSBSTA
46	FSBSTA	FSBSTA	FSBSTA	FSBSTA	FSBSTA
47	WIPSI	WIPSI	WIPSI	WIPSI	WIPSI
48	GAM	GAM	GAM	GAM	GAM
49	BF	BF	BF	BF	BF
50	BA	BA	BA	BA	BA
51	WNGCLA(2)	WNGCLA(2)	WNGCLA(2)	WNGCLA(2)	WNGCLA(2)
52	WNGCMA(2)	WNGCMA(2)	WNGCMA(2)	WNGCMA(2)	WNGCMA(2)
53	FINCLA(2)	FINCLA(2)	FINCLA(2)	FINCLA(2)	FINCLA(2)
54	FINCMA(2)	FINCMA(2)	FINCMA(2)	FINCMA(2)	FINCMA(2)
55	ISFHGR	ISFHGR	ISFHGR	ISFHGR	ISFHGR
56	ISRHGR	ISRHGR	ISRHGR	ISRHGR	ISRHGR
57	ISFSB	ISFSB	ISFSB	ISFSB	ISFSB
58	ISRSB	ISRSB	ISRSB	ISRSB	ISRSB
59	ISDTNT	ISDTNT	ISDTNT	ISDTNT	ISDTNT
60	ISFIN	ISFIN	ISFIN	ISFIN	ISFIN
61	ISWING	ISWING	ISWING	ISWING	ISWING
62	ISHM	ISHM	ISHM	ISHM	ISHM
63	RAD	RAD	RAD	RAD	RAD
64			XL	XL	XL
65			XR	XR	XR
66			DX	DX	DX
67			DY	DY	DY
68			NRT	NRT	NRT
69			MRT	MRT	MRT
70			ILABL	ILABL	ILABL
71			JLABL	JLABL	JLABL
72			NX	NX	NX
73			NY	NY	NY
74			MRKPT	MRKPT	MRKPT
75			LIN	LIN	LIN

Item	PINTEG	CONCLD	RSLTNT	ENVLOP	SCALE
76			LINX1	LINX1	LINX1
77			LINX2	LINX2	LINX2
78			LINY1	LINY1	LINY1
79			LINY2	LINY2	LINY2
80			IXL	IXL	IXL
81			IXR	IXR	IXR
82			IYB	IYB	IYB
83			IYT	IYT	IYT
84			XSMAX(41,25)	XSMAX(41,25)	
85			XMMAX(41,25)	XMMAX(41,25)	
86					
86			CXS(41,25)		
87			CXM(41,25)		

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DOCUMENT CONTROL DATA - R & D

Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Naval Weapons Center China Lake, California 93555	2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED 2b. GROUP ---

3. REPORT TITLE

AIRBORNE STORES CAPTIVE FLIGHT LOADS COMPUTER PROGRAM

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

5. AUTHOR(S) (First name, middle initial, last name)

Lovic P. Thomas

6. REPORT DATE October 1968	7a. TOTAL NO. OF PAGES 304	7b. NO. OF REFS 8

8a. CONTRACT OR GRANT NO. b. PROJECT NO. AirTask A32-320-067/216-1/F009-07-01 c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) NWC TP 4633 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)

10. DISTRIBUTION STATEMENT

THIS DOCUMENT IS SUBJECT TO SPECIAL EXPORT CONTROLS AND EACH TRANSMITTAL TO FOREIGN GOVERNMENTS OR FOREIGN NATIONALS MAY BE MADE ONLY WITH PRIOR APPROVAL OF THE NAVAL WEAPONS CENTER.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Naval Air Systems Command Washington, D. C. 20360

13. ABSTRACT

ABSTRACT. Design loads computations for airborne stores is such a recurrent need that it became worthwhile to program the tedious task for digital computers. Two hanger configurations are treated: (1) the two-lug, four-sway-brace bomb rack common to U. S. stores, and (2) a statically determinate configuration often used for rail-launched missiles. Procedures recommended by MIL-A-8591 are used where applicable. Component hanger loads for stores subjected to arbitrary load conditions in captive flight are printed, and shear-moment distributions are plotted.

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14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Loads:						
Airborne weapons						
Bomb						
Missile						
Bomb rack						
Missile hanger						
Captive flight						
Airborne carriage						
Shear Distribution						
Moment distribution						

DD FORM 1 NOV 65 1473 (BACK)
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